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OVERSEAS RAILWAYS

SPECIAL NUMBER OF THE RAILWAY GAZETTE

On Wednesday next, November 30, there will be issued the Annual Special Number of "The Railway Gazette" devoted entirely to recent progress made by, and current problems affecting, forty important railways in the Colonies, Dominions, India, and other countries such as Argentina and Brazil where British-owned railways operate or are partly British-officered. This number is additional to the ordinary weekly issue, and will be sent to all annual subscribers. Extra copies, price 2s., may be obtained through any newsagent, or direct from the Publisher, post free, 2s. 6d.

DIESEL RAILWAY TRACTION

A Supplement illustrating and describing developments in Diesel Railway Traction is presented with every copy of this week's issue

Fares in the London Transport Area

A CONSIDERABLE amount of misapprehension appears to exist in regard to the recent announcement concerning passenger fares in the London Transport area. It should be recalled, therefore, that when, after the ninth annual review of the standard and exceptional charges of the main-line railway companies in June, 1937, the Railway Rates Tribunal ordered a general increase of 5 per cent. in fares and charges, this did not apply to passenger fares within the London area because Section 33 of the London Passenger Transport Act, 1933, specifically exempted them from review under the provisions of the Railways Act, 1921. The 1933 Act empowered the main-line railway companies to charge such fares as they think fit in the London area, subject to their not exceeding the standard fares fixed under the 1921 Act, but it laid down that any increase in the standard fares must be sanctioned by the Rates Tribunal. The desirability of bringing passenger fares within the area into line with those outside the area has been under consideration by the London Passenger Transport Board and the railway companies for some months. Owing to the varying basis of fares operative on the board's and the main-line railways, and the fact that the former also operates buses, trams, trolleybuses, and coaches, many complex considerations arise and it has proved extremely difficult to determine the best method of dealing with the problem. Ultimately, however, the Standing Joint Committee, which is composed of representatives of the board and the general managers of the main-line railway companies, announced last week that it had decided to recommend to the respective boards that the necessary steps should be taken to provide for an increase of certain fares in the London area.

* * * *

The Proposed Fare Increases

Details of the proposed increases of fares in the London area have yet to be worked out, but it is understood that the main-line railway companies will apply to the Rates Tribunal for an increase of 5 per cent. or thereabout in their standard fares within the London area. The board's charging powers for its railways, tramways, and trolleybuses are prescribed by statute, but its charging powers in respect of its buses are not so governed. The London Passenger Transport Board will be able to adjust a number of anomalies in its existing railway fares without application to the Rates Tribunal, and also to adjust bus fares by alterations in the fare stages, but if it decides to increase certain of its statutory railway fares, the sanction of the tribunal must be obtained. An application will also have to be made to the tribunal in respect of any increase in the statutory ordinary fares on any joint lines in which both the board and the main-line railway companies are interested and, in all the circumstances, it seems improbable that any increase will become effective before February or March of next year.

* * * *

The Week's Traffics

A heavy series of decreases under all headings but that of passenger train traffic brings the receipts of the four main line railways for the past week down by £288,000 in comparison with the corresponding week of 1937. The 45th week showed a decline of £191,000. For the 46 weeks to date the aggregate decrease is £5,582,000 or 3·83 per cent. in comparison with 1937.

	46th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	
	£	£	£	£	£	%
L.M.S.R. ..	+ 1,000	− 87,000	− 52,000	−138,000	− 2,529,000	− 4·30
L.N.E.R. ..	− 2,000	− 60,000	− 43,000	−105,000	− 1,902,000	− 4·43
G.W.R. ..	+ 1,000	− 24,000	− 18,000	− 41,000	− 991,000	− 4·02
S.R.	+ 6,000	− 5,500	− 4,500	− 4,000	− 160,000	− 0·82

In the following table comparisons are made with the 46th week in 1936:—

	46th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	
	£	£	£	£	£	%
L.M.S.R. ..	+ 15,000	− 67,000	− 12,000	− 64,000	+ 11,000	+ 0·02
L.N.E.R. ..	+ 4,000	− 33,000	− 3,000	− 32,000	+ 120 000	+ 0·29
G.W.R. ..	+ 6,000	− 19,000	− 5,000	− 18,000	+ 320,000	+ 1·37
S.R.	+ 13,000	− 2,500	+ 2,500	+ 8,000	+ 654,000	+ 3·51

For the 46 weeks of 1938 there is an increase of £2,647,000 in passenger train receipts in comparison with the corresponding period of 1936, and in earnings from coal class traffic there is still an improvement of £927,000, but merchandise takings are down £2,469,000.

London Transport "C" Stock

While the possibilities of an increase in fares in the London Transport area are under consideration both by the main-line railways and the London Passenger Transport Board, the important group of "C" stockholders represented by Mr. John F. Heaton, the Chairman of Thomas Tilling Limited, is holding a meeting this week to consider a proposal which if sanctioned may, in the opinion of its sponsors, with an increase in fares, get over the present difficulties. The proposal is that in consideration of the "C" stockholders waiving all their existing rights under the Act of 1933, except that which provides for redemption of the stock, the annual rate of interest be reduced to a fixed 4 per cent., coupled with a guarantee by the Government in regard to interest and redemption. In his letter to *The Times* outlining the proposal, Mr. Heaton explains that even though the holders of "C" stock may eventually receive their standard rate of 5½ per cent. through a readjustment of fares, the board will remain in default unless and until the interest deficit to the "C" stockholders in respect of the last completed year is paid. As it would be difficult now to make good this deficit, the "C" stockholders would have an almost perpetual right to apply for a receivership. Another reason given for the proposed guarantee is that the interest on the large amount of capital expended on the development schemes of 1935 with the full support of the Government ranks in priority to the interest on "C" stock.

* * * *

United Railways of the Havana

Operation of the combined undertakings of the United Railways of the Havana and Regla Warehouses Limited in the year ended June 30, 1938, resulted in a net loss of £112,407, as the surplus of £26,688 from warehouses and wharves was exceeded by the loss of £139,905 on the railway. In the previous year the combined undertakings gave a profit of £12,743. The unsatisfactory results in 1937-38 were caused primarily by the severe depression in the sugar industry in the second half of the financial year. Other contributory factors were the necessity for more repairs to rolling stock, the higher price of fuel oil, and the cost of holidays with pay. Road competition for both passengers and goods continued to be intense. The accompanying table refers to railway operations only:—

	1937–38	1936–37
Passengers	2,949,620	3,079,772
Public goods, tons	6,471,920	7,506,705
Revenue train-miles	4,140,324	4,223,652
Average miles open	1,353	1,353
Operating ratio	110·98	101·38
	£	£
Passenger receipts	160,187	162,743
Goods receipts	903,831	1,028,732
Gross receipts	1,266,553	1,407,041
Expenditure	1,405,648	1,426,391
Loss on working	139,095	19,350

Receipts from sugar cane and products were £451,771, a decrease of £81,449 or 15·28 per cent. General merchandise takings, at £236,809, were lower by £20,043 or 7·80 per cent.

* * * *

British Railways and Aircraft Production

Sir Kingsley Wood, the Secretary of State for Air, disclosed in the House of Commons on November 10 that negotiations were in progress between certain firms in the aircraft industry and the main-line railway companies, and that arrangements had been made for the manufacture of some of the larger components used in connection with aircraft to be undertaken in railway workshops. This step is doubtless due to the appointment a few months ago of Mr. E. J. H. Lemon, a Vice-President of the London Midland & Scottish Railway, as Director-General of Production of the Air Ministry. It is understood that the railway companies were asked to consider the possibility of carrying out sub-contract work for aircraft firms adjacent to the area in which the railway workshops are situated, and, as the result, important orders have already been placed with certain of the companies.

* * * *

Conflicting Opinions

As in every sphere of human activity, so in the railway world do we meet with conflicting opinions. Compound or simple locomotives, steel or wooden sleepers, compressed-air or vacuum brakes, power locking frames or panel apparatus, to mention but a few subjects, give rise in Great Britain and elsewhere to considerable discussion. How great can be the diversity of views is seen in the reports offered to such bodies as the International Railway Congress Association and the discussions that ensue. If, in recording the different methods adopted by railways in various parts of the world, we allude to the existence of other opinions, we are far from desiring to cast doubt on the wisdom of the administrations concerned. Our hope is to see all views represented, as far as is humanly possible, and made the subject of a vigorous interchange of ideas, which would ultimately be of interest and benefit to all. We endeavour to abstain from identifying ourselves with particular methods and, when we feel it useful to offer comment on any of them, we desire it to be received in the spirit of these remarks and solely as a step towards promoting helpful discussion.

* * * *

Gold Mining Activity and Railways

The unprecedented scale of the gold mining revival in Western Australia is having its repercussions on the railway system in several ways. On the Northern line, for example, the consequent increase in traffic has necessitated the building of carefully-sited catchments, augmented by dams, to conserve water for locomotives in an arid district. Western Australia, indeed, owed the genesis of its present railway system in part to lines hastily and cheaply constructed during the 'nineties to serve the newly-opened mining areas. In the last few years it has been necessary to formulate a comprehensive policy of track improvement in order to meet the increased demands of a rapidly growing State, and the resuscitation of gold mining today has naturally influenced this policy. In South Africa and in Canada (where gold production is highest in the history of the country) renewed gold mining activity is having its effect on the railways. By the impending completion of a 100-mile branch line, the Canadian National Railways will have access to an extensive new mining area in Quebec.

* * * *

Pest Infestation of Foodstuffs

Considerable progress has recently been made in research into methods of treatment and prevention of the ever increasing menace of pest infestation of foodstuffs, in storage, processing and transport. Attention is being specially directed to grain pests, of which there are some seventy varieties. Until recently the lack of co-ordinated effort made it difficult to apply uniform methods, but the informal conference originally convened by Mr. W. McAuley Gracie, Assistant Goods Manager, Southern Area, L.N.E.R., with the timely recognition of the Ministry of Agriculture, resulted in the formation of a scientific survey, which is being made by the Stored Products

Laboratory of the Imperial College of Science and Technology and conducted by Professor Munro. At the commencement of the survey a research committee was appointed under the chairmanship of Dr. E. J. Butler, Secretary of the Agricultural Research Council, to supervise the survey, consider its results and report to the department. The Standing Conference on Pest Infestation, whose Chairman is Mr. Gracie, and whose membership includes the four main line railway companies, the Port of London Authority, and various trading associations, took unanimous resolutions urging the department to secure immediate considerations of control and action.

* * * *

Narrow-Gauge Speed

In general, maximum speeds over narrow-gauge tracks are limited by the use of sharper curvature than is customary on standard gauge lines. Like standard-gauge speeds, however, those over 3 ft. 6 in. gauge and metre-gauge lines have been rising in various parts of the world. Hitherto Java has probably led the way in the matter of fast travel over the 3 ft. 6 in. gauge, with schedules up to 47 m.p.h. from start to stop and maximum speed up to 60 m.p.h.; Japan and South Africa have been not far behind. Now, in the French colony of Tunis, on the metre gauge (3 ft. 3½ in.), a new service called the Etoile du Sud has been established, and is maintained by twin articulated de Dietrich railcars, covering the 263 miles between Tunis and Gabès in 6 hr., at an average of 43·8 m.p.h. including eleven regular and three conditional stops. The fastest point-to-point booking is from Graiba to Aouinet, 40 miles in 46 min., at 52·3 m.p.h. start-to-stop—probably a record for either metre or 3 ft. 6 in. gauge—and including a conditional stop intermediately. On test these cars have reached 78 m.p.h., which is also probably an easy record for this narrow gauge.

* * * *

A Lamp Type Signal Repeater of 1894

Few, if any, of those who have read of the recent death of the well-known civil engineer Sir Basil Mott, will have connected his name with signalling, still less with signal repeaters. Yet he was concerned with the introduction of the first signal repeater in this country formed of coloured lamp indications to represent the position of the signal. The arrangement was covered by patent No. 9034 of 1894, which he took out in association with Mr. P. V. McMahon, then Engineer to the City & South London Railway, who is happily still with us. The now defunct firm of Dutton of Worcester, had supplied for the original portion of that line from the City to Stockwell, the mechanical signalling which used electric lamps in the signals. Changeover switches on the lever and at the signal varied the repeater circuits in such a way that both lever and signal mechanism had to agree for a light to appear in the repeater or at the signal itself. Extinction of the lights revealed any false position of the signal or discordance between it and the lever in the box. These luminous signal repeaters, eventually seen throughout the City & South London line, were also adopted by the Central London and remained on both until automatic working displaced mechanical signalling controlled by lock and block.

* * * *

First Year of Autonomous Working in Burma

Though the principal features of the first year's working of the Burma Railways under the Burma Railway Board are recorded in an editorial published on page 854 in our issue of November 18, the following other points may be noted. Out of a total of 3·1 million tons of goods carried, 1·7 millions were agricultural produce, on which the average tariff charged was 8·52 pies, or under ¾d. a ton-mile. No serious accident occurred to any passenger train, and during the whole year only two passengers were slightly injured in a train accident. This was when a mixed train parted, and the rear portion collided with the front. Three methods of train working are in force: (1) the Sykes electric lock and block system over 63 miles of line, (2) electric token instruments over 775 miles, and (3) the written paper line clear ticket system over 1,196 miles. In addition more than 600 miles of line are subject to the traffic control system. During the year, and for the first time since the opening of the Irrawaddy bridge at Sajaing, one through passenger service was run each way daily between Rangoon and Myitkyina in the extreme north of Burma, a distance of 725 miles; formerly a change of trains was necessary at Mandalay.

* * * *

Failure of Locomotive Tyres

Serious delays in railway service are occasioned by the failure in service of component parts of locomotives, a large proportion of which is due to fatigue. As was stated by Mr. T. Baldwin, the author of a paper on "The Fatigue Strength of Machined Tyre Steels" read at a recent meeting in London of the Institution of Locomotive Engineers, such fractures on examination are often seen to have occurred at "fatigue flaws" which slowly grow into the sound metal until the latter suddenly breaks in a very brittle manner. The fracture of tyres in service is naturally regarded seriously by locomotive engineers. Apparently tyre breakages have been more frequent on some railways than on others. Most tyre fractures show a small fatigue flaw spreading into the tyre from the machined surface of the bore close to the face of the flange, and on one leading railway it was decided that an attempt should be made to determine the fatigue strength of specimens taken from the actual bores of the tyres. The author's purpose in preparing his paper was to describe in detail the measures adopted for carrying out these tests, and in view of the paucity of information available about the fatigue strength of solid tyres under the conditions in which they are put into service, the paper is opportune.

* * * *

Our Train to Town

We have found that it is possible to feel affection even for an electric train. Long custom prepares the groundwork of an understanding which with adversity may blossom into love. Engineering upheavals recently made our own morning electric train late for so long that its appointed hour of arrival was forgotten by the passengers, and to the staff must have seemed an abstract conception expressed by a mystic sign in the timetable. A steam train in such circumstances would have tried to conceal its humiliation with a self-conscious noise and flurry that would have made us hate it. Our electric train enlisted our sympathy with a sigh of resignation from its brakes every time it was pulled up at a signal, and then fell to "tut-tutting" away on its Westinghouse pump with a disarming mixture of vexation and self-reproach. Watching other trains rush past on what our railway amusingly calls the "slow" line, laden with passengers bound for their eight hours in the office, we began to appreciate the sanctuary of our compartment. Poised between stations, unable to set foot on earth on pain of electrocution, we felt the philosophical detachment of men in the world yet not of it. Provided our train does not transfer its dilatory tactics to the homeward journey, we shall not object.

XUM

British Railways Propose Fundamental Railway Rates Alterations

"A FAIR field and no favour" is a slogan which appeals instinctively to Englishmen, and the appeal of the British railways for a fair field and no favour *vis-a-vis* their road haulage competitors will not fail, we feel confident, to evoke considerable support from members of the public. The circumstances leading up to the momentous step of the railway companies in seeking relief from the existing statutory regulation of the charges for the conveyance of merchandise traffic by railway are simply and concisely outlined in the memorandum which they submitted to the Minister of Transport on Wednesday last, reproduced on page 916. The prejudiced position of the main-line railway companies, as therein outlined, has been considerably aggravated during the present year by the depression in trade, as competition for the reduced amount of traffic available has been greatly intensified and this in turn has led to the repeated quotation of uneconomic rates by a number of road hauliers. The situation has been further complicated by the growing tendency for traders to develop their own transport services under "C" licences. In July, 1937, the Transport Advisory Council unanimously recommended the setting up of machinery for the control of road rates but, apart from an announcement by the Minister of Transport in February last that the Government had approved these recommendations in principle and would introduce legislation in due course, no action has yet been taken in the matter.

In recent months there has been a steadily increasing press campaign conducted by the road haulage interests for the purpose of representing, or rather, misrepresenting, that the railway companies are attempting to interfere with the right of the trader to select the form of transport which he approves and which is most convenient for his purposes. Such statements are entirely inaccurate, because the representatives of the railway companies have been associated with, and supported the whole of, the recommendations of the Transport Advisory Council, and the council's recent Report on Service and Rates specifically laid down that the trader should retain the right to select his own form of transport. The railway companies do not ask, and have never asked, for preferential treatment, but they do contend that they should be allowed the same freedom to compete for traffic as is given their road competitors. In their attempts to secure traffic, over one million exceptional rates have been quoted by the railway companies during the last ten years. Many of these have proved unavailing, as the existing statutory control of the level of the railway rates—with the obligatory provisions as to the classification of merchandise, the publication of all rates, the necessity for the prior approval of the Railway Rates Tribunal of all rates more than 40 per cent. below the standard, and the strict legal provisions regarding undue preference, when compared with the entire freedom of the road haulier in these respects—makes the competitive position of the railway companies inequitable and thoroughly unjust.

The events of the recent crisis showed clearly that in any period of national emergency the railways would be indispensable, as road transport could not possibly cope with the services which the railways would be called upon to perform. Further, the railways can fairly claim that they have been largely instrumental in building up the country's export and import trade upon which we so greatly depend. Is it unreasonable, therefore, that they should seek the same freedom from Parliamentary control of their charges and conditions of carriage as is enjoyed by all other transport concerns and particularly road hauliers? It cannot be reiterated too strongly that the companies do not seek preferential treatment. The plain fact is that they are being gravely injured by the one-sided control of their charges for the conveyance of merchandise, and serious national reactions must inevitably follow if they are denied the right to compete on equal terms with other forms of transport.

* * * *

Devalorisation of the Argentine Peso

THE recent alteration in the price of sterling exchange in the Argentine Republic, brought about by the Government, came as a bombshell to most interested parties, as did the restriction on imports, which was ordered by a special decree. The sale price of sterling on the official exchange market was increased from $16 to $17 (paper), and it is required that all goods imported into the country from December 1 next must possess advance permits. No official announcement has been made as to whether the railway companies will be exempted from this increased rate, or whether the Government will offer this concession to them in exchange for rebates in tariffs for the transport of the coming grain crop, in view of the enormous slump in values at present occurring due to over-production; but either way it is a matter of much concern to the transport companies. Leading men in Buenos Aires connected with these concerns have been interviewed by the press since the ukase went forth, but have mostly avoided an expression of opinion, with the exception of Mr. J. M. Eddy, who gave an estimate of the increased cost of exchange affecting the B.A.G.S. and B.A. Western Companies, and seemed anything but hopeful that the authorities would consider the distressful state of the foreign railway finances and exempt them from the provisions of the new decree. Taking last year's figures as a basis, Mr. Eddy stated that, while the difference in exchange paid by the B.A.G.S.R. had been £1,311,000, under the new decree the company would have to pay an additional £78,000, calculating that the increase of the rate from $16 to $17 to the pound would involve the loss of a further 6 per cent. on exchange transactions. Similarly, while the B.A.W.R. exchange loss last year was £229,000, under the new decree it would this year be an additional £13,740. These figures, he said, were merely approximate, but served to give an idea of the effect of the new measure.

Other British interests particularly affected are those of the importers. Naturally, the value of the peso on the free market has also declined in sympathy, and the rate at the time of writing is $20·22 to the pound, the highest level attained for many years past. The reason given officially for the unexpected measure was to restrict imports in order to protect the peso against a possible depreciation; but as the decree gives officialdom power to restrict imports to the amount of exchange available, why depreciate the peso? Local manufacturers are naturally most pleased with the measure, which they interpret as a device to protect home industry against foreign dumping. Press comment regarding the change has been, on the whole, anything but favourable, as in spite of the fact that the two pesos difference in the buying and selling price of sterling will probably benefit the farmer, he will have to pay more for imported goods such as agricultural machinery and motor vehicles; there is also bound to be an upward trend in the cost of living, due to the extra cost of imported foodstuffs and articles of general consumption, whilst local manufacturers, who can produce competitively, will raise their prices, as usual, instead of transferring the benefits to the consumer. *La Prensa* (Argentina's leading daily paper) asserts that the value of

the country's currency which, according to the Constitution, can be fixed only by Congress, is now merely a matter of instructions issued by the Ministry of Finance to the Central Bank.

Uruguay has already fixed a minimum price for wheat; and the opinion was expressed by leading economists that some of the additional funds accruing from the devalorisation of the Argentine peso would be used for recompensing the wheat-grower for low market prices. This prediction was fulfilled by a decree issued by the Ministry of Agriculture on November 14, fixing the minimum price of wheat as $7·00 per 100 kilo., and of linseed at $13·00 per 100 kilo. Exchange control was first enforced in Argentina in 1931, but it was not until November, 1933, that the present system, or something very like it, came into being. It was then decided to purchase all export bills at 15 pesos to the pound (an increase of 20 per cent. on the quotation then ruling) and sell them to the highest bidder on a daily auction system. In this way the export bills fetched as much as $17·44 to the pound, the Government taking the difference between the two rates. The original object of this scheme was to finance a system of minimum grain prices, but only an infinitesimal portion of the funds collected, which by the end of last year amounted to $390,534,100, was actually employed to that end. In 1934 the auction system was suspended, and a fixed selling rate of 17 pesos to the pound was established, other currencies being allowed to fluctuate according to their relation to sterling on the international markets. A special rate of $15·75 was granted for railway remittances to London, and in December, 1936, the Government decided to halve its exchange profits by reducing the general selling rate to 16 pesos, from which it has again been increased to 17.

It seems, however, that since we began drafting the above remarks, on the basis of information received from our correspondent in Buenos Aires, the railway position has materially changed. Although still no formal official announcement has been made, Sir Follett Holt, at the annual meeting of the Entre Rios Railways Company on Monday last (November 21), told the shareholders that he had that morning received cable advice that the President of the Republic has promised Dr. Leguizamon (Chairman of the Local Committee of the Buenos Ayres Great Southern and the Buenos Ayres Western Railway Companies) that the railway companies in Argentina will be granted exemption from the recent decree raising the 16 peso rate of exchange to 17 pesos; *i.e.*, that the companies would continue to receive their remittances at the 16 peso rate, for which they were grateful.

* * * *

Possibilities of Velox Boiler for Locomotives

REFERENCE has several times been made in these pages to the use of the Brown-Boveri Velox steam generator on locomotives, and on May 8, 1936 (page 903) we described an experimental French locomotive (an ex-P.L.M. Railway 4-6-0) having the boiler replaced by one of these compact but very unconventional generators. This particular locomotive is now undergoing trials on the French National Railways and we publish on page 910 a picture showing its general appearance. In seeking to evaluate the suitability of the Velox generator for railway work, the French engineers have very wisely retained as many conventional features as possible in their experimental locomotive. The duty of the generator in this locomotive is to provide steam at the not unduly high pressure of 290 lb. per sq. in. and at 380° C. to ordinary cylinders with orthodox driving gear. If the generator is proved by the present tests to be an entirely practicable means for enhancing the steaming capacity of the locomotive without adding to its overall dimensions or its weight, the main objectives of the experiment can be regarded as attained. Because the Velox generator provides an opportunity for rearranging a locomotive in almost every respect, the next stage in the investigation of its possibilities might well consist in the consideration of the many more or less novel types of power unit (*e.g.*, geared, all-enclosed high-speed engines or turbines) that could conveniently be accommodated with it in the space a locomotive is permitted to occupy. For the present it would already seem useful merely as a substitute for the boiler in an engine which can no longer do the work expected of it. In the French engine the change results in a power increase of about 33 per cent. It also enables the driver's cab to be placed at the front as in a diesel or electric unit. Being automatic in its control the Velox generator does not require constant attendance, and a locomotive in which it is used can therefore be handled by one man.

* * * *

Entre Rios Railways

EXCEPT for one short period when dull days delayed the ripening of the crops, weather conditions in the territory served by the Entre Rios Railways were during the year ended June 30, 1938, uniformly favourable for wheat and linseed and the resultant harvests were good as regards both quantity and quality. The increase of over 20 per cent. in net receipts may be considered satisfactory at a time when railways generally in Argentina were recording heavy reductions. Better harvests coupled with high prices for the grain increased the public's spending power with the result that a record number of passengers was carried. The reduced fares which came into force on January 1, 1936, and the diesel services have continued to have a marked effect in fighting road competition for passenger traffic.

On the goods side the improved commercial situation resulting from better harvests was the main cause of the increase in general merchandise traffic from 116,570 tons to 137,950 tons, with an improvement in receipts from £126,838 to £148,323. Competition from both river and road was checked by the E.T.E.L. agencies, which continued to expand their radius of action. In the year under review the express companies' traffic was 39,477 tons and £40,052, compared with 36,710 tons and £37,626 in the previous year. Some operating figures are:—

	1937-38	1936-37
Passengers	505,952	441,050
Public goods, tons	984,382	835,014
Ton.-km. (goods and livestock)	306,174,208	274,950,071
Average haul, km.	273·4	287·6
Operating ratio, per cent.	77·65	79·42
	£	£
Passenger receipts	180,215	165,705
Public goods receipts	652,753	575,741
Gross receipts	1,064,166	952,423
Working expenses	826,364	756,419
Net receipts	237,802	196,004

For maintenance of way and works the charge was £97,583, an increase of £7,095, and the amount charged to maintenance of rolling stock was £149,286, an increase of £7,199. Locomotive running expenses were £24,391 higher, at £191,689, and traffic expenses advanced by £12,051 to £195,258. State railway developments in Entre Rios and their relation to the company's system were discussed by Sir Follett Holt at the meeting reported on page 918.

XUM

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Trans-Atlantic Testimonial

State University of Iowa, Iowa City, U.S.A.
November 7

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—After long planning to subscribe to THE RAILWAY GAZETTE, I did so, beginning July 1. I want to tell you that I enjoy it much; and look forward each week to the arrival of successive issues. I find the GAZETTE of great assistance; indeed I find even your comments relative to the railways of the United States most intriguing—because it gives me a glimpse of our own problems through the eyes of those far removed. I hope that it may be my privilege to continue to enjoy THE RAILWAY GAZETTE for an indefinite period.

Yours faithfully,

S. L. MILLER,
Professor of Transportation

The Aylesbury Branch Mystery

56, St. Mary's Mansions, Paddington, W.2
November 4

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Page 22 of *Bradshaw's Guide* for May, 1847 (reproduced herewith), raises a very interesting question as to the actual method of working the trains to and from Aylesbury. Such documents and maps as were on exhibit at the Centenary Exhibition at Euston last September shed no light on the problem, and perhaps some of your readers will be able to elucidate the matter.

It will be noticed that the two through trains from Euston to Aylesbury do not serve Cheddington station, and the Aylesbury arrivals quoted under the 7.30 a.m. and 6 p.m. departures from Euston also ignore Cheddington, though this, of course, might be due to the fact that the Aylesbury train actually started from Tring, so that, if a Cheddington time were to appear in the column, it might erroneously be assumed that the through train from Euston (which obviously did not stop at Cheddington) gave a service from Cheddington to the north.

But page 23—the up service for May, 1847—complicates matters still further, for here one of the through trains (10.45 a.m.) from Aylesbury to Euston is shown as calling at Cheddington (10.58), while the others (and the Aylesbury to Tring services connecting with up main-line trains) do not,

No. 1.

Secs., { Richd. Creed, Euston-sq., London. / H. Booth, Liverpool. **London&NorthWestern—LONDON & BIRMINGHAM Section** Engs., Robert Stephenson / Gen. Man., Capt. Huish.

Down Trains.	8 a.m.	6½ a.m. Mixt 1.2.3. 4.5.6. 8. ¼	7 a.m. 3rd class 4.5. *	7½ a.m. Mixt	8½ a.m. Mxd.	9 a.m. Mixt 4.5.6. 7 8.	9 a.m. Exp. 1cls. only 6.7. *	10 a.m. Express 1.2. *	10½ a.m. Mixt 4.5.6. 8	10½ a.m. Mixt	10½ a.m. Mixt	11 a.m. Mixt 2.3.	11 a.m. Mixt	11 a.m. Mixt	12 noon Mixt 4.5.	12½ p.m. Mixt 2.3.	2½ p.m. Mixt	3 p.m. Mixt	3½ p.m. Mixt	4 p.m. Mixt 4.5.	5 p.m. 1st class Express 2 *	5 p.m. Mixt	5½ p.m. Mixt	6 p.m. Mixt	8½ p.m. mail. Mixt 1.2. *	9 p.m. mail. Mixt 4.5.6. 7.8. *	10 p.m. Mixt
STATIONS. TRAINS LEAVE																											
EUSTON SQ.	..	6 15	7 0	7 30	8 30	9 0	9 25	10 0	10 30	10 45	11 0	11 10	12 0	12 30	2 45	3 0	3 45	4 0	5 0	5 5	5 30	6 0	8 45	9 0	10 0
Willesden arriv.	..	..	7 17	..	..	..	..	..	..	..	..	11 26	..	..	..	3 16	..	..	..	5 21	..	6 16	..	..	10 16
Sudbury	..	..	7 20	..	..	..	..	..	..	..	..	11 31	..	..	..	3 21	..	..	..	5 26	..	6 21	..	..	10 21
Harrow	..	..	7 36	7 52	..	..	..	..	..	..	..	11 35	12 22	12 52	..	3 28	..	..	..	5 31	..	6 30	..	..	10 28
Pinner	..	..	7 38	..	..	..	..	..	..	..	..	11 40	..	..	..	3 30	..	..	..	5 36	..	6 34	..	..	10 30
Bushey	..	..	7 43	..	..	..	..	..	..	..	..	11 49	..	..	..	3 39	..	..	..	5 44	..	6 40	..	..	10 39
WATFORD	..	6 52	7 55	8 9	..	9 30	..	..	11 5	11 20	11 37	11 55	..	1 9	3 20	3 45	..	4 30	..	..	6 7	6 51	9 14	9 30	10 45
Kings Langley	..	..	8 6	8 15	..	..	..	..	..	..	..	12 3	..	..	..	3 53	..	..	..	5 52	..	7 0	..	..	..
Boxmoor	..	..	8 18	8 29	..	..	..	..	..	..	..	12 13	12 53	1 29	..	4 3	4 30	..	..	6 4	..	7 12	..	..	..
Berkhampstead	..	..	8 44	8 39	..	..	..	..	..	..	..	12 23	..	1 39	..	4 13	..	..	..	6 15	6 26	7 22	..	..	..
TRING	..	7 28	8 57	8 48	9 33	..	10	10 10	10 53	11 35	..	12 34	..	1 48	3 58	4 24	..	5 0	..	6 30	6 37	7 33	9 51	..	..
Cheddington	..	..	9 10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Aylesbury	..	..	..	9 30	..	..	..	..	..	..	..	1 0	..	..	..	4 45	..	..	..	..	..	8 10	..	..	..
LEIGHTON	..	7 48	9 28	9 8	..	10 18	..	..	..	12 9	12 34	..	1 31	2 8	4 17	..	5 6	..	..	..	6 57	7 50	..	10 20	..
Bletchley & Fenny S.	..	..	9 46	9 23	..	..	..	..	..	..	12 43	..	..	2 23	..	..	5 18	5 23	..	..	7 10	8 3	..	..	..
WOLVERTON	..	8 12	10 3	9 37	10 12	10 40	..	11 27	12 17	12 32	12 59	..	1 57	2 37	4 43	..	..	5 40	6 20	..	7 22	8 20	10 37	10 45	..
Roade	..	..	10 34	10 5	..	..	..	..	..	..	..	..	..	3 5	..	..	..	..	..	..	..	..	..	..	..	..
BLISWORTH	..	8 45	12 0	10 12	..	11 12	..	..	12 45	12 55	1 32	..	‖	‡12	5 16	..	..	6 10	..	..	7 55	..	‖	..	..
Weedon	..	9 2	12 15	10 31	11 0	..	11 18	12 1	1 2	..	1 48	..	2 45	3 34	5 33	..	..	..	..	..	8 12	..	11 29	..	..
Crick & Welton	..	..	12 35	10 49	..	..	..	..	..	..	..	..	..	3 49	..	..	..	..	..	..	..	..	..	..	..
RUGBY (M.C.J.	8 0	9 35	12 34	11 10	..	11 55	11 40	..	1 30	..	2 20	..	3 15	4 10	6 0	..	..	6 45	..	..	8 45	..	11 53	12 0	..
Brandon	8 15	..	1 14	11 25	..	..	..	..	..	..	..	..	..	4 25	..	..	..	..	..	..	..	..	..	..	..
COVENTRY	8 28	10 2	1 28	11 39	11 55	..	..	12 44	..	..	2 45	..	..	4 40	6 27	..	..	..	7 25	..	9 17	..	12 18	..	..
Hampton (D.J.)	8 58	10 25	2 2	12 3	12 17	..	..	..	..	..	3 8	..	..	5 5	..	..	..	..	..	..	..	..	..	..	..
BIRMINGHM	9 35	10 50	2 40	12 35	12 45	..	..	1 25	..	..	3 35	..	..	5 31	7 15	..	..	..	8 0	..	10 0	..	1 5	..	..
Walsall	..	11 37	4 4	..	1 22	..	..	..	..	..	4 38	..	..	6 25	..	..	..	..	..	..	..	..	1 50	..	..
Wolverhamptn	..	11 52	4 24	..	1 40	..	..	2 13	..	..	4 50	..	..	6 42	..	..	..	..	8 34	..	..	..	2 0	..	..
Stafford	..	12 20	5 17	..	2 10	..	..	2 41	..	..	5 24	..	..	7 22	..	..	..	..	9 3	..	..	..	2 28	..	..
Whitmore	..	12 55	6 32	..	2 49	..	..	3 14	..	..	6 0	..	..	8 1	..	..	..	..	..	..	..	..	3 0	..	..
CREWE	..	1 15	7 29	..	3 12	..	..	3 35	..	..	6 24	..	..	8 28	..	..	..	..	9 47	..	..	..	3 25	..	..
Hartford	..	1 44	8 24	..	3 41	..	..	3 56	..	..	6 51	..	..	9 1	..	..	..	..	..	..	..	..	3 59	..	..
Warrington	..	2 16	9 16	..	4 5	..	..	4 19	..	..	7 18	..	..	9 38	..	..	..	10 25	..	..	..	..	4 27	..	..
LIVERPOOL	..	3 15	10 30	..	5 0	..	..	5 10	..	..	8 15	..	..	10 45	..	..	..	11 10	..	..	..	..	5 25	..	..
CHESTER	..	2 26	9 10	..	4 38	..	..	4 38	..	..	8 5	..	..	9 40	..	..	..	10 35	..	..	..	..	4 21	..	..
LANCASTER	..	4 40	..	..	6 30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6 32	..	..

* Day Tickets, &c.—see page 24. ‡ For Private Carriages of passengers going by the 10 a.m. train to Birmingham and the North

† In connexion with Trains to Northampton. ‖ In connexion with Trains from Northampton. Private carriages and Horses are not conveyed by the express or mail trains, nor can they be booked unless they are at the stations 15 minutes before the time specified in the tables.

1. Trains in conjunction with Fleetwood and Belfast.
2. Trains in conjunction with the Birmingham and Gloucester.
3. Trains in conjunction with the Birmingham and Derby Junction.
4. Trains in conjunction with the Midland Counties.
5. Trains in conjunction with the North Midland.
6. York and N Midland, and York and Newcastle.
7. Trains in conjunction with Newcastle and Carlisle.
8. Trains in conjunction with Hull and Selby.

§ Carriages for third class passengers to Hull and Newcastle will be attached to this train.

The small figures in the head refer to the connexion of the respective trains with other lines, as at foot.

Facsimile of page 22 from "Bradshaw" of May, 1847, showing the Aylesbury service

apparently, serve Cheddington. That passengers from Aylesbury to the north did actually travel *via* Tring (not Leighton), and were not transferred at Cheddington, is made clear by a note on page 35, which refers to a "Third Class Carriage . . . attached to the Train from Aylesbury . . . to convey Passengers to the Third Class Up and Down trains at Tring." But did Aylesbury trains actually travel to the present site of Cheddington station and reverse there, or was there a direct connection from the down main line to the Aylesbury Railway, still in use after Cheddington station had been opened, and served by one "up" Aylesbury train—the 10.45 a.m. already referred to? Early maps, which merely give the Aylesbury Railway at right angles to the main line, are of no assistance, but it is significant that several guides mention the Aylesbury Railway as diverging from the main line at "mile-post 35¼" (nearly a mile south of the present Cheddington station) where there are, indeed, some faint traces of what may have been the course of an old line. When the writer first travelled over the Aylesbury branch (in 1898 or 1899) he observed also some signs of an old "spur" having joined the branch about half-a-mile west of Cheddington, but no such traces exist today.

Yours,

R. E. CHARLEWOOD

Locomotive Driver or Engineer?

London, S.W., November 16

To the Editor of The Railway Gazette

Sir,—In connection with the controversy in your pages on whether or not an engine driver should be called a locomotive engineer, you may be interested to know that in the U.S.A., where engine drivers are usually called engineers, the title of the locomotivemen's union is the "Brotherhood of Locomotive Firemen and Enginemen." Thus, even in the States, no claim appears to be made by the men themselves that they are locomotive engineers in the generally accepted sense.

Yours faithfully,
W. S.

London, November 8

To the Editor of The Railway Gazette

Sir,—Might it not help to settle the interesting controversy now proceeding in your columns under the above heading if the terms of an old conundrum (having reference to another subject) were applied to the present one? As reworded to meet the circumstances, it would read:—

Question: "When is a Driver *not* a Driver?"
Answer: "When he's an Engineer."
Question: "When is an Engineer not an Engineer?"
Answer: "When he's an (Engine) Driver."

Yours truly,
E. N. GINMAN
(ex Loco. Inspector)

A G.N.R. Record Run of 1895

198, St. Helen's Road,
Hastings, Sussex
October 27

To the Editor of The Railway Gazette

Sir,—The joyous reappearance of Stirling's No. 1 has revived memories of the very scanty details which have been published anent a remarkable run by a private special conveying a surgeon on August 4, 1895, from King's Cross to Peterborough. I have a press cutting which refers to the guard's statement that the 76·4 miles were covered in 68 minutes, with a load of two carriages. Such a time seems extraordinarily fast for the period and was certainly, so far as is known, not equalled nor even approached in either direction for many years. The quickest time to pass Peterborough on the most halcyon night of the race to Aberdeen (curiously enough, a few weeks later) was about 72 min. with a load of just over 100 tons.

I was but a small boy in '95 and it was long before my days of recording the traffic on the Great Northern, so I am wondering if one of your readers may perhaps have an authentic note of the actual engine concerned, with—possibly—some precise detail of the running times achieved.

I am, Sir,
Yours faithfully,
R. W. H. WEIGHT

Stores Balances

October 28

To the Editor of The Railway Gazette

Sir,—I send you some comparisons of stores balances on certain South American railways and Indian railways, based on information given in current reports of the Central Argentine and the Buenos Ayres Great Southern Railways and from the Indian Railway Administration Report of 1936-37, which may, perhaps, be of interest. They are as follow:—

	Central Argentine Railway Year ended June 30, 1938	Buenos Ayres Gt. Southern Railway Year ended June 30, 1938	All Indian Railways For year 1936-37
Stores balance ..	£2,089,590	£4,238,462	£6,900,000
Mileage	3,700 miles	5,084 miles	43,128 miles
Train mileage ..	14,179,392	16,634,145	182,886,000
Stores balance per mile	£564	£833	£160
Stores balance per train-mile ..	£0·14	£0·25	£0·03
Ratio	4·66	8·33	1·00

Yours &c.,
AN INDIAN RAILWAY ENGINEER

PUBLICATIONS RECEIVED

Engineering Workshop Principles and Practice. By A. G. Robson. London: Emmott & Co. Ltd., 28, Bedford Street, W.C.2. Manchester: 31, King Street West, 3. 8½ in. × 5½ in. 312 pp. Illustrated. Price 7s. 6d. net.—This is the fifth edition of a useful work which first made its appearance in November, 1914. It places at the disposal of the engineering student the essential principles on which alone future success in mechanical engineering can be built up. Written in plain language and illustrated by numerous diagrams and more detailed drawings of a practical kind, the work undoubtedly fills a distinct want where those in training for the profession of mechanical engineering are concerned. Its subject matter covers a fairly wide field, including machining operations and the tools used in conjunction with them, the formation of various component parts of engines, heat-treatment methods, and the manufacture and properties of metals, including descriptions of tests and the results accruing therefrom. The index appears to be sufficiently comprehensive as a guide to the contents of the 32 chapters of the book.

Centrifugal Fans.—Keith Blackman Limited, 27, Farringdon Avenue, E.C.4, has published a new catalogue, with full dimensional particulars shown on diagrammatic folding plates, of Keith and E.K. centrifugal steel plate fans. Both types incorporate the Keith multivane impeller, which is characterised by structural rigidity and silent operation derived from its low peripheral speed. In the E.K. fans, a later development of the Keith type, outlet and inlet are practically of the same dimensions, giving a discharge velocity about three-quarters of that of the corresponding Keith fan without sacrifice of manometric efficiency. In the larger sizes of fans, high-speed or low-speed impellers can be fitted.

Copper for Earthing.—Owing to the increased attention now being paid, on grounds of safety, to the efficient earthing of electrical installations, the Copper Development Association has issued an illustrated booklet dealing with the principles of earthing systems, the design of electrodes, and the applicability of copper for earthing purposes. Practical hints are given on the choice of a suitable type of electrode, the spacing of the earth system, and the selecting of the situation in which it is to be buried. One chapter is devoted to quoting examples of the resistance of copper to earth corrosion, and this is illustrated with examples of copper pipes after lengthy service underground or accelerated corrosion tests. The booklet is obtainable free of charge from the association, at Thames House, Millbank, London, S.W.1.

Electrical Wiring.—We have received from British Insulated Cables Limited, Prescot, Lancs, a series of pamphlets listing cables and wiring accessories for electrical installations. Cables are shown in the 250-volt and 660-volt classes, with conductors of high-conductivity hard-drawn tinned copper wires and vulcanised rubber insulation. Another leaflet describes the company's standard design of cross-connecting network boxes for circuits up to 660 volts, fitted with duplicate busbars to permit changeover of cables without interruption to the supply. All boxes have a lid designed to withstand a maximum head of 6 ft. of water. The company also sends particulars of B.I. copper earthing rod for radio installations, having a finned surface which greatly increases the effective area of contact.

XUM

THE SCRAP HEAP

The death is reported from Budapest, at the age of 72, of Aaron Aranyi, who, the victim of a railway accident in 1911, lived for the next ten years in a coma. When he recovered in 1921 it was to find Europe changed by a four-year war of which he had known nothing, and he set himself to learn his history and geography afresh. Possibly his end was hastened by the idea of having to master a new set of changes just as he was getting things straightened out.

* * *

Mr. Bernard W. Cooke, 66-year-old craftsman, of Ashbourne Road, Derby, who took second prize in the *Daily Mail* rug-making competition with a Snow White and the Seven Dwarfs rug, has been making rugs for only four years, since he retired from the position of Works Manager of the L.M.S.R. Signal Department at Derby. "It's something to do at night while I'm listening-in to the radio," he told me. He does all his own designing, although he admitted that his wife sometimes makes suggestions to avoid colour clashes.

* * *

The L.N.E.R. has found employment as a platelayer at Ponders End, Middlesex, for the husband of Mrs. Ada Milton, the woman who, on October 5, saved a train by running through a storm to warn the station staff at Broxbourne that a telegraph pole had fallen on the line. A cheque for 10 guineas has already been presented to Mrs. Milton by the L.N.E.R. (as recorded in our issue of October 14), and now it has been announced that a passenger on the train has started a fund on her behalf, subscriptions for which are being received by the Bishop's Stortford Season-Ticket Holders' Association.

* * *

THE SONG OF THE LOCOMOTIVE DRIVER

The following song of a locomotive driver (with a philosophic commentary by his engine) has been published in the *Nigerian Transport Services Monthly Bulletin*. The verses are by Will Lawson, the New Zealand poet:—

"Oh, I'm driving—driving,
There's many thousands striving,
Some men drive cows,
Some foaming prows,
I set my wheels a-driving.
Now hear the words my engine speaks
Slow, rhythmic yet not singing,
As by the peaks and tumbling creeks
Her eighty tons goes ringing.
'Man's life is just two far-stretched rails
With many a curve and crossing.
The levels change, the wide curves range
Up grades and down, a-tossing.
And men must live and men must die,
So what's the use of growling.
The signal falls, the whistle calls
Full steam—and take it howling.'
These words are cheering like to those
Whose lives are full of striving.
The smooth valves gape, the smooth valves close,
And I am driving—driving."

* * *

The importance of Jewish passengers on the railways in the East-end is strikingly illustrated by the fact that the authorities of the East London Railway have found it advisable to issue handbills in Yiddish containing

Poster in Yiddish issued by the East London Railway in January, 1901

instructions as to the traffic to the Crystal Palace. These are specially addressed to the inhabitants of Shoreditch, Whitechapel, and Shadwell.—*From "The Railway News" of March 9, 1901.*

* * *

ONE POINT OF VIEW

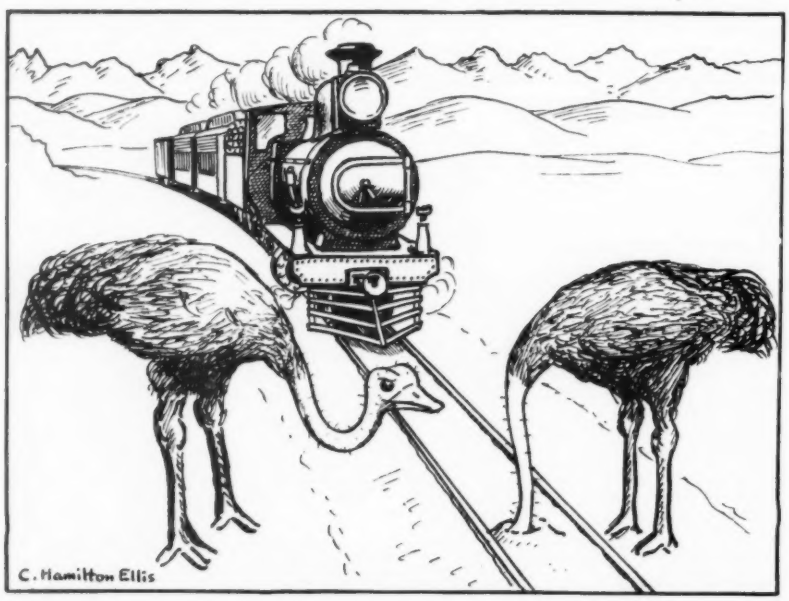
Take the fastest, newest express train that hurtles you through stations before you have time to read the name and gives you a drunken roll as you walk forward to the dining car, and you travel at only half the speed of the *Ensign*, and without that adjustable chair. In that luxury express you pass over points that break the monotony of the rhythm of the wheels, past shunting goods trains that clatter horribly at unexpected moments. In the *Ensign* there is only, barely audible, the steady soothing note of those four engines.—*Impressions of a flight in the new Imperial Airways "Ensign" air-liner, from the "Imperial Airways Gazette."*

* * *

One day last week I had just left Covent Garden tube station when I saw a messenger boy push his cycle under the nose of an L.M.S. van horse drawn up by the kerb.

The horse, which was muzzled, made a vicious snap at the boy's arm, and I could see that the savage sound of teeth meeting teeth made him jump almost out of his skin.

A pale, pimply little boy, the messenger pulled himself together in a second, glared at the horse, ran his eye over the huge van with its bold inscription "L.M.S.," and then said, with an air of challenge: "Want me to travel L.N.E.R., do yer?"—*From The "Evening News."*



Muffled Voice: "Quick Egbert! lots of sand here!"

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

ARGENTINA

Further Wage Reductions on Central Argentine Railway

As from October 1, salaries and wages on this railway have been still further reduced, the 3·3 per cent. cut, referred to in these columns in THE RAILWAY GAZETTE of September 30, effective from September 1, having been increased to 4·95 per cent. This step has been rendered necessary by the continued fall in the receipts and the fact that the immediate outlook is not bright, as no definite improvement in the financial situation can be expected until the harvest begins to move about January next.

Proposed New State Railway Station for Salta

On the last day of the ordinary parliamentary sessions, September 30, the Chamber of Deputies approved a Bill presented by the Ministry of Public Works, for the construction of a new station for the North Central Argentine (State) Railway in the city of Salta. The cost of the new station, which will be equipped with all the most modern installations for the rapid and efficient handling of passenger and goods traffic, is estimated at 1,600,000 pesos.

The Railways and Road Construction

Despite the fact that the construction of the system of national roads throughout the country has by no means been entirely to the advantage of the railways, and has even been in some ways detrimental to their interests, they have nevertheless rendered valuable assistance to the National and Provincial Governments in connection with the transportation of the necessary materials at some 50 per cent. less than the ordinary rates. It is gratifying to know that this further practical contribution on the part of the railways to the national progress has been recognised and appreciated by the Argentine authorities. On the occasion recently of the completion of the construction of the Dolores section of the new coastal road between Buenos Aires and Mar del Plata, the President of the Province of Buenos Aires Road Council, Dr. Jorge A. Renom, sent a message to Mr. C. R. S. Harris, Director-General, B.A.G.S. and B.A.W.R., expressing his appreciation of the very effective assistance rendered by the former railway in the transport of the materials utilised on the construction of the new highway. In his reply, Mr. Harris congratulated the council on its splendid achievement, adding that his company would at all times be pleased to co-operate in any other similar work of importance that might be undertaken in the future by the public authorities, having for its object the progress of the country.

QUEENSLAND

Use of Firewood as Locomotive Fuel

The strike of coal miners throughout Australia which commenced on September 9 and ceased in Queensland on October 19, caused a very serious drain upon the stocks of coal held by the Queensland Railways. To safeguard against a cessation of traffic and to conserve coal supplies, experiments were made with the use of firewood as fuel for locomotives. So successful were they that practically all locomotives, with the exception of tank engines and those working night mail trains with sleeping cars attached, were worked with a fuel consisting of one part coal to four of wood; special spark arresters were fitted to the chimneys. On page 912 are reproduced photographs showing an engine, the tender of which was loaded with wood fuel, also the arrival of supplies of wood fuel at the Mayne junction locomotive depôt.

Effect of Coal Strike upon Railway Services

To conserve coal supplies and to enable the railways to maintain essential services, certain classes of goods had to be refused for conveyance by rail, namely, cement, machinery, fertilisers, iron and earthenware pipes, bricks, and timber. Arrangements were, however, made by the Transport Board to license road motor lorries to carry these goods wherever possible. Both goods and passenger services were severely curtailed and railcar services replaced steam services where this could be arranged. Night suburban services round Brisbane were drastically curtailed, and after 6.30 p.m., only two trains—and in some instances one—were run from the city to each of the districts. Sunday suburban day services were reduced by about half and there was no night service after about 6 p.m. On one Sunday no suburban service was run.

Five-Day Week for Government and Railway Administrative Offices

The working of a five-day week in Government offices began on Monday, September 19, and was extended to the railway administrative offices as from October 3, the delay so far as the Railway Department was concerned being due to the necessity for taking a ballot of employees, which was arranged by the Court of Industrial Arbitration. Government Offices are, therefore, closed on Saturday mornings but skeleton staffs are employed in certain offices to attend to urgent business. As offices now open on Monday to Friday at 8.30 instead of 9 a.m. and close at 6.0 instead of 5.0 p.m., several re-arrangements of suburban train services have been necessary.

Salary and Wage Cut Restoration

In accordance with the Salaries Act of 1930, reductions of Government Railway salaries and wages were imposed (*a*) as from September 15, 1930, varying from 10 to 15 per cent., and (*b*) as from July 1, 1931, varying from 15 to 20 per cent. Since 1934, the Industrial Court has adjusted the salary and wage rates from time to time, the last salary restoration being in April last. The following are the reductions on the July, 1930, rates at present in force :—

Salaried Officers		
July, 1930, Rates		*Present reduction p.a.*
£90–150	...	£5
£221–425	...	£10
£450	...	£18
£500	...	£20
£600	...	£24
£700	...	£28
£800	...	£32
£900	...	£36
£1,000	...	£40
£1,100	...	£55
£1,500	...	£75

The present reduction on weekly wage employees is 4s. below the 1930 figure.

VICTORIA

Novel Welded Mild-Steel Locomotive Trailing Bogie

A new type of locomotive trailing bogie truck has recently been designed, and is now in production at Newport workshops. It is being fitted to the redesigned " X " class goods locomotives now under construction, and three are already in service and giving satisfaction. The design closely resembles the Delta type cast steel truck hitherto used, but in addition to weighing less than half the weight of the cast steel truck without loss of strength, it is considerably cheaper, and is more easily and cheaply repaired. These bogie trucks are equipped with a booster having a tractive effort of 9,000 lb. The truck parts are cut out with an oxy-acetelyne torch, assembled in a jig, and electrically welded.

INDIA

Bhadaura Derailment Report

It is understood that the Senior Government Inspector of Railways who held an inquiry into the derailment of the East Indian Railway 18 down express near Bharaura on October 16 has reported to the Railway Board that he has found conclusive evidence that the derailment was due to sabotage. Fishplates and bolts removed from the rails have been found in the vicinity of the accident. The General Manager of the E.I.R. has notified that a reward of Rs. 5,000 will be paid for information leading to the

arrest and conviction of the culprit or culprits. A similar reward was announced in connection with the derailment of the Punjab mail near Madhupur a short time back, but so far without any satisfactory result.

Attempts at train wrecking have not been infrequent on the E.I.R. in the past, particularly in the Dinapur Division, and at one time a regular patrol of the line by night was instituted. The resumption of the patrol is likely to prove an effective palliative.

Railway Breaches Restored

The breaches on the East Coast section of the Bengal-Nagpur Railway and on the Parlakimedi Light Railway were repaired and normal running of trains was resumed on October 21.

FRANCE

Maximum Speed Raised on Le Mans Line

The Minister of Public Works has authorised the State Railways to raise the speed limit of 120 km.p.h. (75 m.p.h.) by 10 km.p.h. for express or fast trains on the line from Paris to Le Mans. The innovation will come into force as soon as certain necessary adaptations have been carried out in order to meet the higher speeds. The higher limit of 130 km.p.h. (81¼ m.p.h.) will facilitate the working of the Brittany line, and will materially ease the task of drivers, who will be able to avail themselves of the higher speed limit in maintaining their average of 110 km.p.h. for the journey of 211 km.

On trial a 3,700-h.p. electric locomotive drawing a test train of six heavy coaches and two vans weighing about 350 *tonnes* (344¾ tons) easily reached a speed of 168 km.p.h. (104 m.p.h.). Many other French lines are suitable for 130-km. speeds for trains and 140 for railcars. On the National Railways no fewer than 1,679 km. of double line are suitable for average speeds of over 110 km. (68¾ miles) p.h. and many of them for 120-km.p.h. speeds.

National Railways Deficit

Due to the trade depression, gross receipts of the National Railways Company (S.N.C.F.) to date are nearly two milliard francs, or about £11,000,000 below the estimates, so that the operating deficit for the year 1938 is now put at three milliards, or about £16,500,000. Traffic losses have accumulated during the year, despite increases of about 25 per cent. in passenger and freight tariffs, applied in the summer of 1937 and on January 1, 1938, and severe economies in all branches of railway working. This state of affairs has increased the difficulties of preparing the 1939 budget, which was due to be presented to the Ministers of Public Works and Finance on November 1.

Under the convention of 1937, the S.N.C.F. was authorised to raise its tariffs to make good any deficit, and a third rise in fares and freight rates to take effect on August 3 was decided upon. The Government, however, refused its assent, but instead reduced the passenger taxes from 13 and 8·7 per cent. to a flat rate of 2·2 per cent. from August 1, thus providing a sum of fr. 400 million, on condition that the company took steps to raise a further sum of 450 millions. This was done by cutting down operating and maintenance expenses and by raising freight rates for goods carried in full wagon loads.

Reducing Railway Staff

The company has found it difficult to effect savings by reducing the number of employees. Nearly 100,000 additional men were taken on when the 40-hr. week was introduced. The reduction of the total staff can be effected only slowly and mainly by retirement on pension. This proceeds at the rate of 20,000 a year, corresponding to a saving of fr. 400 million. It took the railways five years (from 1929 to 1934) to reduce the total staff by 73,000 men. But savings in this direction have been largely offset by increased expenses due to the general rise of prices, especially of fuel. Savings made this year by cutting down expenses, according to M. Guinand, President of the board, are estimated at a milliard francs, about £5,500,000. But it will be impossible to balance the railway budget because of the rise in prices and the falling off in traffic. This latter factor makes it impossible now to increase fares and freight rates.

Railway Debt Charges

The railway budget for 1939 must be framed to include an extra financial burden of fr. 750 million. It represents a fifth part of the fr. 3,750 million of railway financial charges at present borne by the national budget. This sum is gradually to be incorporated in the railway budget. It is independent of the 2,200 million of deficits accumulated under the polling system of the 1921 convention. The total railway deficits, comprising the financial debt charges, to be met by the Government for the current year amount to nearly nine milliard francs, or about £50,000,000.

ITALY

Towards Self-sufficiency

In order to reduce to a minimum the importation of foreign metals, coal, and lubricants, the State Railways administration is taking all reasonable steps to substitute Italian produced metals and fuels, and to cut down the consumption of coal and oil. Among the measures adopted with this end in view are standardisation of rolling stock, mass production methods, and the substitution of steel for copper fireboxes, with consequent decrease of 80 per cent. in weight and 30 per cent. in cost. The success achieved with the former is shown by the fact that in 1905 there were 173 classes of steam locomotives, whereas at the end of June last there were only 83, and by the end of the year the figure will be still further reduced to 66.

At the same time the theory of fuel consumption is being carefully studied, and more efficient methods of firing and lubrication are being demonstrated. As a result a saving of 7 per cent. has been effected in coal consumption. Wherever the design and condition of a boiler permits, its working pressure is being raised, and further efficiency is being secured by feed water heating and valve improvements. New streamlined express locomotives are to be built, tests having shown the value of streamlining for such service.

By combining all these improvements it is estimated that a 30-per cent. reduction in coal consumption is effected, and it has also been decided to use 40,000 tons of lignite annually instead of steam coal. In Sardinia a special type of firebox is to be used to enable Sardinian coal to be burnt.

MEXICO

First Results Under Workers' Control

The General Manager of the Mexican National Railways has issued a signed note, which is published in the staff journal *Ferronales*, on the subject of the results of the first three months' administration of the National system by the workers' directorate. The note says that the ratio of working in the month of May was 82·59 per cent.; in June 85 per cent., and in July 85 per cent. The figures for the last two months were approximate only, as the accounts had not yet been audited. It will be remembered that the Decree under which the working of the railways was confided to the workers' representatives. fixed 85 per cent. as the maximum permissible ratio of expenses to receipts [as mentioned in THE RAILWAY GAZETTE of September 9, page 449—ED., *R.G.*]. When the workers' committee took over the working of the railway system on May 1, the note goes on to say, the economic situation of the railway administration was a desperate one, the debts demanding immediate attention amounting to 18,841,000 pesos. Of this outstanding debt, 7,907,535 pesos were paid in the first three months, and in addition, the quarterly instalment was paid for rolling stock from the U.S.A., amounting to $540,187, or 2,700,890 pesos, making a total of 10,608,426 pesos. A further amount of nearly two million pesos was also paid to the National Government on account of taxation. Wages and salaries had all been paid to date, and all current local commitments met. The deficit on the Interoceanic line was now covered. The General Manager ends his note with the confident assurance that the administration will be able to keep working expenses within the figure of 85 per cent. fixed by the Decree.

A UNIFIED COLONIAL RAILWAY SERVICE?

By a Colonial railway officer

A CAREFUL scrutiny of the article published on page 520 in THE RAILWAY GAZETTE of September 23 under the above heading, compels the conclusion that the writer does not intentionally contribute anything either for or against unification. Unconsciously, however, he puts forward two of the soundest arguments in its favour, (1) when he says that " the divergence in statutory authority and financial relations can be rectified without the aid of a highly-paid ' co-ordinator ' in London "; and (2) when, later on, he contends that " divergence in annual reports and their measures of effort " surely requires " no highly-paid post of meddlesome activity in London . . . to secure a greater measure of uniformity," and that " an intelligent clerk " could do the needful. For if these statements are correct, why has the action advocated not been taken?

The writer admits the divergencies in both cases, and so far as statistics are concerned, one has only to read, mark, and learn, yet the Secretary of State spent public funds on the Lambert Committee, though its recommendations were not adopted, mainly, it would seem, because there was no one in London to co-ordinate the views of the railways or with sufficient technical knowledge to enforce a policy. The statement in the article under review, " that any State railway has been commercialised is a contradiction in terms " is directly refuted by the highly successful commercialisation of the Kenya & Uganda Railways, which system has eradicated politics from railway affairs. What other measures could be taken to eliminate political interference, which everyone—including the writer—admits is bad for railways.

Reverting to the " intelligent clerk," the suggestion that he could secure a greater measure of uniformity in annual reports in a few hours, as a co-ordinating post-office, in London, is fantastic, and no general manager worth his salt would take dictation by a clerk lying down. There can be no one who would wish to suggest any reflection or criticism of the Crown Agents, who have done and are doing such valuable work, but they have no disciplinary powers or means of coercing a recalcitrant general manager; they can only make suggestions.

Incidentally, in the second paragraph of his article, the writer presumably means " railway user " and not " taxpayer " as printed. Also in his third paragraph he incorrectly quotes (in inverted commas) the words " the highly paid office in London," which do not appear in the article published on August 5.

* Articles and letters debating this subject have appeared in our issues of May 13, July 15, August 5, August 19, and September 23

REINFORCED CONCRETE ROOFS AT BLACKPOOL, L.M.S.R.

(*See illustrations on page* 911)

AS excursion traffic increased at Blackpool North station, L.M.S.R., new platforms were constructed alongside the original station. Being used only at periods of peak traffic, however, the minimum accommodation was provided. The extension of the season at Blackpool caused by the illuminations resulted in increased excursion traffic, and, as this took place towards the end of the summer when weather was apt to be unfavourable, it was decided to provide a roof over the concourse at the rear of the excursion platforms. The concourse is 270 ft. long and slightly over 60 ft. wide, and the floor is sloped from the platforms towards the street, the former being at a slightly higher level. A range of brick buildings at the side farthest from the platforms contains the usual lavatory accommodation and offices. As these buildings were in good condition it was decided to retain them while allowing in the design of the concourse roof for their ultimate replacement by buildings of a more modern type shou'd this become necessary.

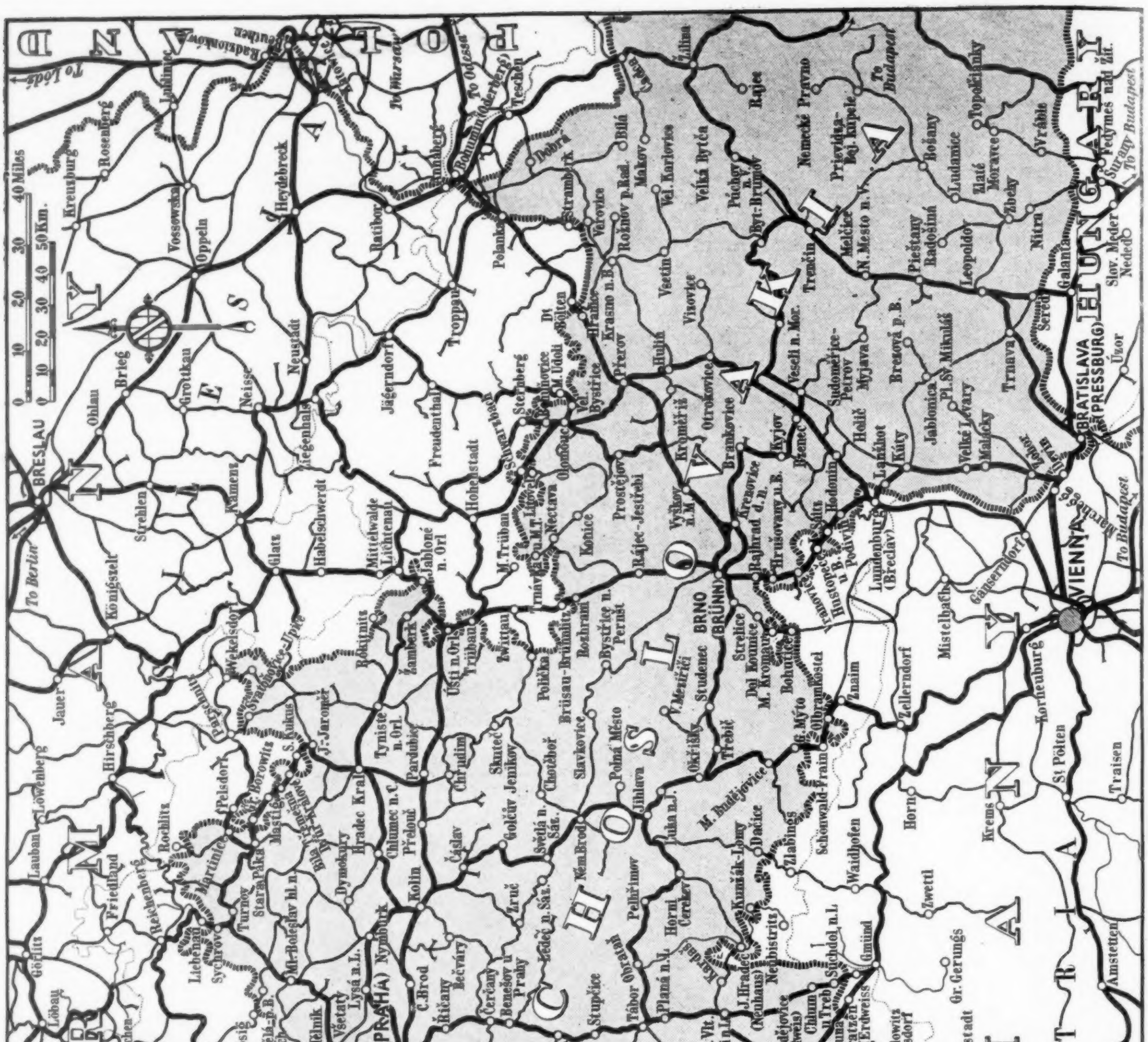
The new concourse roof is 270 ft. long and is supported by reinforced concrete rigid frames at 40-ft. centres spanning 62 ft. A stretch of patent glazing is provided on each side of the ridge, giving ample lighting in the day time. The remainder of the roof is covered by 4-in. reinforced concrete slabs carried on concrete beams extending between the frames. The gable walls are also of reinforced concrete and connect it to the main roof beams so that the wind pressure can be dealt with simply.

Protection was required for the ticket collectors at the barriers, which are outside the concourse, and short umbrella roofs have been provided for the purpose. The layout was complicated by the fact that the platforms are at a slight angle to the centre line of the concourse. This part of the work is separated from the main rigid frame by a continuous expansion joint. The platforms and ticket barriers are closed off from the concourse by a continuous wall with sliding doors. Wherever possible the walls have been laid out in panels suitable for posters. The conduits for loud speakers and electric lighting were built into the concrete slabs, and the roof generally presents a clean and pleasing appearance.

The main contractor for the work was Holland & Hannen and Cubitts Limited of London. The patent glazing was supplied and fixed by Mellowes Limited of Sheffield, and two concrete pavement lights were supplied by Lenscrete. The whole of the work was designed and detailed by the staff of the Chief Engineer of the London Midland & Scottish Railway.

THE CENTENARY OF ELECTRO-PLATING.—In 1838 the first patent involving the process of plating by electrolysis, based upon Michael Faraday's discovery of the fundamental principle of electro-magnetic induction, was taken out by Dr. O. W. Barrett, of Birmingham. The first magnetic machine used in the commercial practice of electro-deposition was that made by John Stephen Woolrich, in Birmingham, in 1844. The machine was constructed with heavy baulks of timber erected in rectangular form upon which four sets of permanent horse-shoe magnets were bolted, and the armature made to revolve between the poles of the magnets. The machine was 5 ft. 4 in. high, 6 ft. long, and 2 ft. wide. Faraday visited the works where the machine was installed, and expressed his delight at seeing the practical use of his discovery. A second dynamo made for electro-deposition was constructed by Woolrich in 1851. While this machine was similar in electrical design to the earlier model, mechanically it was a great improvement.

XUM



THE NEW BOHEMIAN FRONTIERS OF CZECHOSLOVAKIA AND THEIR RELATIONSHIP TO THE RAILWAY LINES

The Czech-German frontier is based on a map officially supplied to us by the Reichsbahn showing the boundaries fixed on October 10, which we have modified slightly in view of the final delimitation agreement. The Hungarian and Polish frontiers are still only approximate

THE NEW FRONTIERS OF CZECHOSLOVAKIA

Brief details of the arrangements for the resumption of railway traffic between Czechoslovakia and other countries across the new borders

(*From our own correspondents*)

AT the moment of writing railway communications between Czechoslovakia and other countries are still paralysed—totally so far as Hungary and Poland are concerned. The only available railway line between Czechoslovakia and abroad—the main line from Brno (Brünn) *via* Zilina, Košice, and then along the previous Hungarian frontier to Roumania—was cut as a consequence of Hungary's territorial gain. Communication with Germany, however, is slowly being restored. Recently two main lines connecting Czechoslovakia and Germany have been reopened to passengers and goods traffic, *i.e.*, the Prague—Dresden and the Prague—Pilsen (Plzeň)—Eger—Nuremberg lines.

Resumed Main-Line Services

On the Prague—Dresden line the frontier station on the Czech side is Terezin-Bohušovice, 49 miles (79 km.) from Prague (Masaryk station), whilst on the German side the frontier station is Lobositz, 43 miles (7 km.) north of Terezin-Bohušovice. Two halts, Německé Kopisty and Lukavec, which lie between the two new frontier stations 1·8 miles (3 km.) and 2·5 miles (4 km.) respectively to the north of Terezin-Bohušovice, have been closed. By this new frontier arrangement Czechoslovakia has lost 31·6 miles (51 km.) of this double-track main line on which the former common Czech-German frontier station was Bodenbach (Podmokly). The line north of Bodenbach, though on former Czech territory up to Schöna-Herrnkretschen station (distant 8·2 miles or 13·3 km. from Bodenbach) was owned and worked by the German State Railway in accordance with an agreement reached a few years ago with a view to facilitating through working of the line from the common frontier station. Out of the four fast trains daily which were worked through from Prague to Dresden prior to the Munich agreement, only two stopped at Lobositz for a minute each, and none at Terezin-Bohušovice, where only slow trains and one semi-fast train stopped. In the reverse direction there were five fast trains daily, of which only two stopped at Lobositz. According to the type of stopping train, it took from 1 hr. 22 min. to 2 hr. 37 min. to reach Terezin-Bohušovice from Prague.

On the Prague—Pilsen (Plzeň)—Eger line, the Czech frontier station is Křimice, 75·7 miles (122 km.) from Prague (Wilson station) and only 4·3 miles (7 km.) from Pilsen (Plzeň). Thus the Czechoslovak loss on this line, where the frontier station formerly was Eger (137·8 miles or 222 km. from Prague) amounts to 62·1 miles (100 km.). The German frontier station is Tuschkau Kosolup, 3·1 miles (5 km.) to the west of Křimice. Vochov halt, lying between these frontier stations, 1·8 miles (3 km.) west of Křimice, has been closed. Neither Křimice nor Tuschkau Kosolup was a stopping station for fast trains prior to the new arrangements.

New Frontier Stations

Negotiations for the gradual establishment of frontier stations, and reopening of railway lines between Czechoslovakia and Germany are continuing under the terms of the agreement signed in Berlin on October 27 between the two governments providing for the resumption of railway traffic on October 31 across the provisional new frontier. Fifty transit points, covering practically all the main routes, have been fixed in accordance with traffic requirements. Traffic is being resumed gradually with other countries beyond the two States concerned.

For the time being, the international rates and fares in force before the new frontier was set up are being used, and in the case of goods traffic this is necessary to prevent the new frontier stations, not yet equipped to deal with any considerable amount of traffic, from being overloaded. There is therefore a temporary restriction on dispatching goods to be sent on from the new frontier or on partly paid goods. At present, too, traffic is limited to heavy goods in wagonloads; express parcels and similar traffic are not accepted. Traffic between the Sudeten territory and Czechoslovakia is being carried at the old Czech inland rates so as not to disturb business arrangements. Consignments are routed according to the international rates list and routes laid down therein, *via* the most convenient frontier station; but, owing to certain obstacles, they have to be taken at times by longer routes, although rates remain undisturbed. Separate agreements between the local offices concerned have been made to apportion the receipts according to the altered lengths of line in each State.

"Privileged" National Services

A "privileged" passenger and goods service has been established between Austria and Silesia on the Lundenburg—Annaberg and Lundenburg—Mittelwalde sections, with German rates and fares and no passport, Customs, or money formalities. The reverse arrangement, using Czech rates and fares, is in force for through Czech services which now pass through German territory between Česká Třebová (Trübau) and Olomouc (Olmütz), Trübau and Březová-Brněnec (Brüsau-Brünnlitz), and Hranice (Weisskirchen) and Polanka.

The Final Czech-German Frontier

On Monday last, November 21, the Commission of Ambassadors established under the Munich Agreement, took note of and formally confirmed the final frontier between Germany and Czechoslovakia, as delimited by a Czech-German Commission. The course of this frontier is indicated on the map reproduced opposite, which is based upon an official map of the German frontier fixed on October 10 last (for which we are indebted to Dr. Gerhard Sommer, Chief of the Press Service, German State Railway) modified according to the latest of our information so far as that frontier has been varied to a minor extent subsequently. The chief differences are that the German frontier now includes part of the district of Choden (in the neighbourhood of Taus in south-western Bohemia) not originally included, and also the important railway junction of Devin, near Bratislava (Pressburg). In all, we understand that the modifications since the fixing of the October 10 line result in the transfer to Germany of 70 more villages, and the return to Czechoslovakia of 27 villages and places which passed tentatively to the Reich when the approximate frontier was drawn.

The Czech-German frontier is based on a map officially supplied to us by the Reichsbahn showing the boundaries fixed on October 10, which we have modified slightly in view of the final delimitation agreement. The Hungarian and Polish frontiers are still only approximate

XUM

LOCOMOTIVE AND ROLLING STOCK METALLURGY

A note on the paper discussing heat-treatment presented to the Institution of Locomotive Engineers by Mr. A. H. C. Page, of the L.M.S.R.

OF recent years the introduction of higher speed trains has brought a distinct change in the metallurgical aspect of locomotive and carriage and wagon construction. The factor continually facing the mechanical engineer is the increased weight of larger boilers and engines generally, and the fact that he is restricted to a maximum axle load by the civil engineer. This necessitates the introduction of metals with higher physical properties than the materials formerly used, thus allowing of reduced sections with consequent savings in weight. The heat-treatment of metals in connection with locomotive and carriage and wagon building was taken as the subject of a paper read last Wednesday before a meeting of the Institution of Locomotive Engineers by Mr. A. H. C. Page, Chief Works Metallurgist of the London Midland & Scottish Railway, who, in the course of an analytical survey of the subject, provided much useful information and a considerable amount of data concerning it. Although, as the author stated, an increase of carbon content only in the straight carbon steels will give the required increases in tensile strength, this is accompanied by reductions in the elongation and Izod impact values, and the desired results are best achieved by the introduction of alloy steels. The use, however, of the light alloys of aluminium and magnesium should not be overlooked in this direction, for although their application is limited to details not subjected to heat to any great extent, these alloys have definite possibilities. Some years ago, two shunting engines were fitted by the L.M.S.R. with certain motion parts of aluminium alloy, and although generally the results were unsatisfactory, due to excessive scoring and wear, it is thought that the use of similar alloys could be extended to fittings not subjected to wear, and which at present are manufactured in mild steel or bronze. Weight saving by the use of alloy steels is well illustrated in the "Princess Coronation" class locomotives of the L.M.S.R., and also in the three-car diesel unit which that company has recently put into service, and it will be remembered that an article dealing with the metallurgical aspect of the design and construction of the "Princess Coronation" engines was published in the issues of THE RAILWAY GAZETTE dated February 18 and 25 this year (also issued as a reprint).

The disadvantages associated with the use of alloy steel principally make themselves felt in connection with the machining of the parts, when the speeds and feeds may have to be reduced by some 20 per cent., as in the case of nickel-chrome-molybdenum steel, due to the higher Brinell hardness of the steel in the heat-treated condition; also in the flame-cutting of frame plates and in other directions. The use of alloy steels, as the author pointed out, introduces no difficulties in forging and heat-treatment, but, on account of the narrower working temperature limits, more exact control of these operations is required than for carbon steel details. Numerous parts connected with the reversing gear of locomotives are specified to be case-hardened, and much investigatory work has been carried out in this direction. A further development in the adoption of alloy steels has occurred in the manufacture of laminated locomotive springs, and considerable experimental work has been done in connection with the use of chromium and silico-manganese steels for this purpose. The chief advantage lies in the fact that satisfactory and more even hardness can be obtained in the quenched and tempered condition, using oil as the medium. When using carbon steel, water-quenched, a tendency to cracking and distortion is sometimes experienced in the thinner sections, accompanied by an uneven hardness in the section, whereas with alloy steels the elastic limit is higher than with plain carbon steels.

Although steel castings are being replaced to a certain extent in locomotive manufacture by welded designs, there is still considerable use for them in modern construction. The heat-treatment generally given to details of this nature is that of annealing at or slightly above a normalising temperature with a view to relieving casting stresses, and also to refine the size of grain. The heat-treatment of carriage and wagon details is generally confined to draw-gear, swing beam suspension bolts, bearing spring suspension bolts, and the normalising of drop stampings. The treatment of these and other parts in rolling stock construction can be carried out successfully in furnaces fired with pulverised coal, and this system is adopted on the L.M.S.R. with successful results. We are glad to see that the author included some references to tool steels, as these play an all-important part in the machining of materials and component parts built into locomotives and railway passenger and freight vehicles.

Locomotive Balancing Practice

The question of locomotive balancing is one of the first importance, and is correspondingly of great interest. So far as British railways are concerned, there has been a tendency towards the reduction of hammer-blow, but only on a conservative basis. Much lower balancing proportions are adopted on many Continental and overseas locomotives. France and Spain, for instance, have two-cylinder engines with only 30 per cent. of the reciprocating parts balanced, and in Germany two-cylinder locomotives have been built with less than 20 per cent. overbalance. On the Japanese railways only 23 to 35 per cent. of the reciprocating parts are balanced on locomotives with two outside cylinders, and 20 per cent. on locomotives with three cylinders. On the Garratt locomotives built for the Algerian section of the P.L.M., 30 per cent. overbalance was provided, the running speed being 65 m.p.h. In his paper entitled "Counterbalancing and its effects on the locomotives and on the bridges," Mr. D. C. Brown drew attention to the fact that railways which have shown particular interest in this problem of hammer-blow are those in the overseas parts of the Empire. Many of these lines are still in a state of comparatively vigorous development, and traffic requirements call for more and more powerful locomotives. In many cases the loading gauge is generously proportioned, and the limiting factor is the allowable loading on the tracks and bridges. There is, therefore, a strong incentive to make the reduction in hammer-blow as drastic as possible so as to increase the permissible weight of the locomotive, and several interesting experiments have been carried out on these lines.

NEW LOCOMOTIVES FOR ARGENTINA

Twenty engines, some of the 4-6-2 and others of the 4-8-0 types, have recently been completed by the Vulcan Foundry Limited for the Buenos Ayres Great Southern Railway

(*See illustrations on pages* 906-7)

TWELVE locomotives of the 4-6-2 type, Class " 12K," and eight of the 4-8-0 type, Class " 15A " have been built by the Vulcan Foundry Limited under the inspection of Messrs. Livesey & Henderson, consulting engineers, London, for the Buenos Ayres Great Southern Railway. The 4-6-2 engines are constructed to negotiate curves of 100 m. radius and are for passenger service, whilst the 4-8-0 engines are designed to negotiate curves of 150 m. radius, and are for passenger and mixed services. The boilers are identical in both cases in so far as their general dimensions are concerned, and they are also duplicates of boilers recently fitted to other classes of locomotives on the same railway. The inside firebox is of steel, with rigid water space stays of Longstrand hollow steel and flexible stays in the breaking zones. The roof stays are direct with the exception of the three front rows and two back rows, which are of the flexible type. The tubes are of solid drawn steel, and the superheater has a multiple valve regulator header. A slide type master regulator is also fitted in the dome, operated from the cab by means of a hand wheel. Four of the 4-8-0 type engines have single-unit thermic syphons built into the fireboxes.

The steam stand has separate chambers for saturated and superheated steam, the latter being used for the chime whistle, sanding, oil fuel, blower, and vacuum brake ejector. The more important boiler fittings comprise three Ross safety valves; a Bird Archer blow-off cock, with large capacity muffler; boiler pressure gauge; and cylinder steamchest pressure gauge. The boiler feed-water is delivered through clackboxes on the sides of the boiler barrel by a Gresham & Craven No. 10 non-lifting injector on the right-hand side and a Davies & Metcalfe No. 9 class " H " exhaust steam injector on the left-hand side of the engine. The boilers and fireboxes are clothed with Limpet stooled blue asbestos mattresses. Smoke screens are fitted to the sides of the smokeboxes, and a flame pan is provided with the oil fuel burner at the front end; the lower part of the firebox is lined with firebrick. The cab is fitted with a front door on the left-hand side and windows at the back and sides; upholstered seats and armrests are provided for the driver and fireman. The electric lighting equipment, provided by J. Stone & Co. Ltd., comprises headlight, cab, and motion lamps.

Frames, Cylinders, and Motion

The main frames are made from steel plates, and the coupled axleboxes are of Stone's bronze, oil-lubricated. The leading bogie in each class is of the swing-link type with outside bearing axleboxes, oil lubricated. In the 4-6-2 locomotives, the hind truck axleboxes are of the Cartazzi type with oil lubrication. The cylinders are placed outside the frames and drive the second pair of coupled wheels. Steam distribution is effected by 10-in. dia. piston valves, and the majority of the engines are fitted with Walschaerts valve gearing. Four of the 4-8-0 type, however, have Caprotti poppet valve gearing. The cylinder drain cocks are steam operated, and United Kingdom metallic packings are used for the piston rods. Gresham & Craven steam sanding equipment is fitted, delivering sand in front of the driving wheels only. Other details of equipment include Westinghouse (vacuum) brake gear; and, in the cab, a Wakefield Eureka four-feed sight-feed lubricator with transfer filler having connections to the cylinder barrels and steamchests. The engines with Caprotti valve gear are similarly equipped, except that the Wakefield lubricator is of the two-feed sight-feed pattern with transfer filler having connections to the cylinder barrels only. The Ajax system of grease lubrication is employed for the bogie and hind truck axlebox guides, coupled wheel hubs, motion pins (Walschaerts gear), connecting rod small end bushes, bogie centres, bottom swing link pins of the bogie, and spring compensating beams.

Duplication of Parts

The tender bogies are of similar construction to the engine bogies but without swing links; wheels, axles, and axleboxes are duplicate with those fitted on the engine bogie. The tender underframe, water tank, and oil fuel tank follow closely existing tender design on the railway. Whitaker staff exchange apparatus is provided on both sides of the tender. Grease lubrication of the axlebox guides is effected by Ajax grease nipples.

The capacity of the tenders is 6,000 gal. of water and 11 tons of oil. In working order the 4-6-2 engine weighs 88 tons 9 cwt., of which 54 tons is available for adhesion, and the tender weighs 67 tons 16 cwt., a total of 156 tons 5 cwt. The 4-8-0 engine weighs 89 tons 10 cwt. in working order, of which 65 tons 11 cwt. is available for adhesion, and with the tender (the same weight as the 4-6-2 type), the total is 157 tons 7 cwt. The 4-6-2 engine develops a tractive effort of 85 per cent. of the boiler pressure of 26,850 lb., and the 4-8-0 type 29,945 lb.

The following table gives the leading dimensions of the locomotives:—

	4-6-2 type	4-8-0 type	
Cylinders (2)—			
Dia.	19 in.	19½ in.	
Stroke	28 in.	28 in.	
Wheels, coupled, dia.	6 ft. 0 in.	5 ft. 8 in.	
,, bogie ,,	3 ft. 2 in.	3 ft. 2 in.	
,, hind truck, dia.	4 ft. 0½ in.	—	
Wheelbase, rigid	14 ft. 0 in.	18 ft. 6 in.	
,, total engine	33 ft. 1 in.	30 ft. 7 in.	
,, engine and tender	60 ft. 10¾ in.	60 ft. 10¾ in.	
Working pressure	225 lb. per sq. in.	225 lb. per sq. in.	
		Without syphon	With syphon
Heating surface—			
Boiler tubes (115)	896 sq. ft.	896 sq. ft.	896 sq. ft.
Flue tubes (34)	654 sq. ft.	654 sq. ft.	654 sq. ft.
Firebox	190 sq. ft.	190 sq. ft.	186 sq. ft.
Syphon	—	—	32 sq. ft.
Total evaporative	1,740 sq. ft.	1,740 sq. ft.	1,768 sq. ft.
Superheater	428 sq. ft.	428 sq. ft.	428 sq. ft.
Combined total	2,168 sq. ft.	2,168 sq. ft.	2,196 sq. ft.
Grate area	32·6 sq. ft.	32·6 sq. ft.	32·6 sq. ft.

In the design of the 4-8-0 Class " 15 A" locomotives the duplication of parts with those fitted to the 4-6-2 " 12K " Class, is a noteworthy feature, embracing boiler with mountings, smokebox, clothing, motion details, bogie, coupled axles and axleboxes, general fittings, and tenders.

XUM

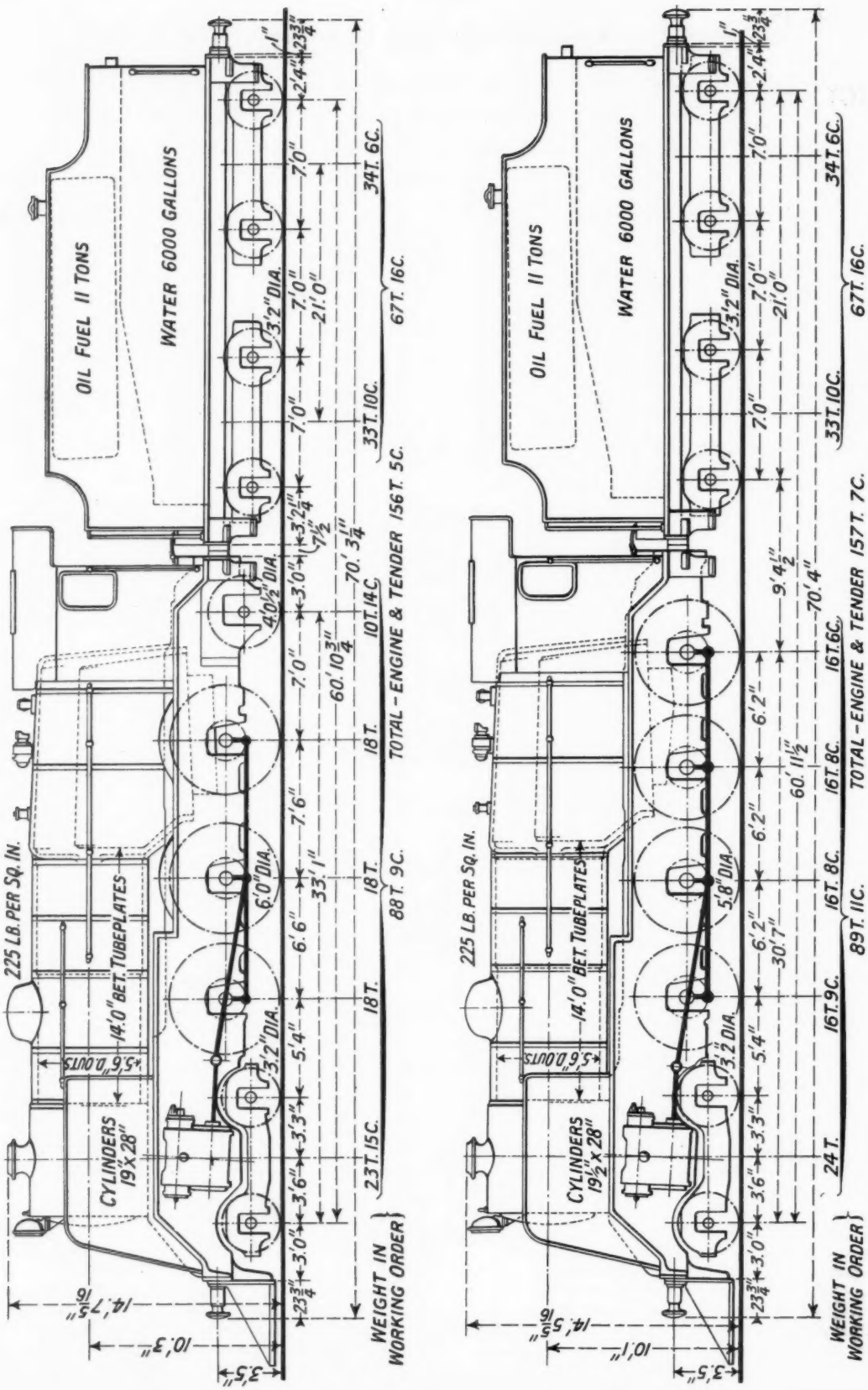
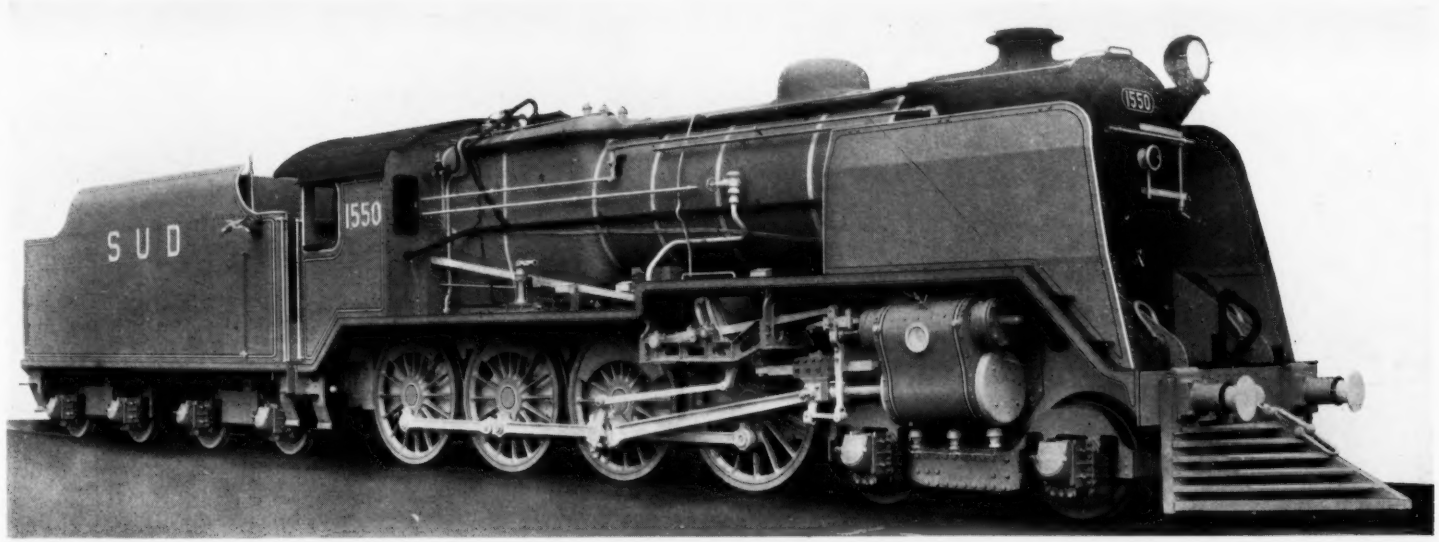


Diagram drawings showing general dimensions and weight distribution of 4-6-2 and 4-8-0 locomotives, Buenos Ayres Great Southern Railway, built by the Vulcan Foundry Limited



New 4-8-0 type mixed traffic locomotive, Buenos Ayres Great Southern Railway

New 4-6-2 type passenger locomotive, Buenos Ayres Great Southern Railway

NEW LOCOMOTIVES FOR ARGENTINA, BUILT BY THE VULCAN FOUNDRY LIMITED

(*See article on page* 905)

A MODIFIED TRAIN STAFF AND TICKET SYSTEM

An electric token apparatus for train staff and ticket sections, with counting feature, in use on part of the L.N.E.R.

THE train staff and ticket system of single line working, one of the oldest known, has continued to find favour on some sections of railway. Where there are intermediate block posts between crossing loops, and that system, combined with the block telegraph, provides all the facilities normally desired, it does so with a minimum of apparatus, and that of a very simple kind. The switching in and out of the block posts is easily arranged, the train staff and ticket working being confined to controlling the direction of the traffic between the loops.

The disadvantage of the oldest form of the arrangement, using paper or card tickets, was that only trains carrying the staff could use intermediate siding points; but in recent years this has been remedied by making the tickets take the form of keys and controlling their issue in a suitable manner. The other well-known disadvantage, that the staff might at times be at the wrong end of a single line section and have to be transferred to the other to enable traffic to be carried on, still remained.

A modified form of working the train staff and ticket principle, using keys as tickets, has been introduced and installed between Wragby, Donington, and Louth, one of the branches of the L.N.E.R. in Lincolnshire. Credit for the successful evolution of this form of working is, we understand, due to Mr. W. D. Rodgers and Mr. G. H. Leversedge, Works Manager and Technical Assistant respectively in the Signal Engineer's Department, L.N.E.R. (Southern Area). The apparatus was supplied by W. R. Sykes Interlocking Signal Co. Ltd., Clapham, London, S.W.4.

Principles of Working

The object of the apparatus, which may be described as an electric train staff and ticket system, is to enable the general simplicity of the original idea to be retained, with the present intermediate block posts and block telegraph, but eliminating the risk of the staff being sometimes at the wrong end of the single line. The essential fundamental feature consists in using two staffs, one at each loop station controlling the single line, belonging always to their own particular station and never leaving it when ordinary traffic movements are made. The only train to which a staff is ever given is one that is to return to the loop station from which it starts; all other trains carry key tickets, but they must—as with the old system—see a staff when they accept one. To prevent this occurring at both ends of the single line simultaneously, the apparatus is so constructed that if a staff is free to be shown at the one loop, the other is locked in the apparatus at the opposite loop, while only at the former can the starting signal be cleared, electric locking being provided for the purpose, which can be further combined with the block telegraph instrument if desired.

The key tickets can be issued as required from the instrument where the staff is free to be shown to a train, those at the other end of the section, in common with the staff, being locked in the instrument there. To reverse the direction of traffic the staff previously free must be locked in its instrument, and the one at the other end of the section released, to enable keys to be issued there, but this cannot be done until the total number of the keys has been electrically counted, proving that none is still out of the instruments.

The Apparatus

Fig. 1 is a general view of the instrument, and Fig. 2 shows one of the key tickets. Both key tickets and staffs are available for unlocking intermediate siding lever locks,

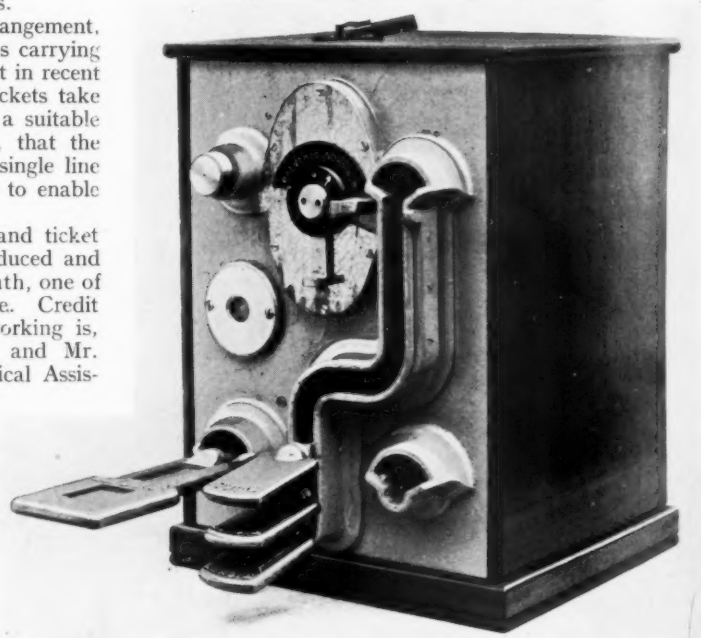


Fig. 1—Train staff and key ticket instrument, L.N.E.R., showing staff in the "inactive" aperture, hand plunger, indicator, counting switch, and key tickets, "active" staff aperture out of service

but each can be inserted only in the part of the instrument intended to receive it. The key tickets are inserted and withdrawn through an opening at the top of a magazine slot, in a manner well known, and at the bottom of the instrument, on each side of the slot, are apertures for the reception of the staff. The right-hand one is known as the "active" aperture, the other as the "inactive." When the staff is in the former, key tickets can be withdrawn and trains can be despatched, but when in the latter everything is locked and control of traffic rests with the other loop station, provided certain formalities have been complied with.

The instrument has a hand plunger and a rotary ratchet switch and eye-ball indicator used during the process of traffic reversal. Electric interlocking, as above mentioned, is provided between the staff when in the "active" aperture, and the starting signal lever. Both instruments contain certain locks and other apparatus essential to the ordinary working, and one contains a set of counting relays with which proof is obtained that no key ticket is out when the direction of traffic is being reversed.

If we assume traffic to be proceeding from *A* to *B*, the staff at *A* will be in the "active" aperture of the instrument there, that at "B" being locked in the "inactive" part of its instrument. To withdraw a key ticket at *A* the staff must be rotated in the instrument, which action also electrically releases the starting signal lock, and then withdrawn for showing to the driver of the train as authority to accept the ticket, according to well-known rules. This can be repeated for as many trains as key tickets are available, block telegraph governing the subsequent movements, with intermediate signal boxes on the single line, should traffic necessitate them.

Reversal of Traffic

To reverse the direction of traffic and allow trains to run from *B* to *A* the procedure is as follows:—

The signalman at *A* removes the staff from the "active" aperture of the instrument, preventing any further key ticket being extracted therefrom, inserts it in the "inactive" aperture, and turns it, when it becomes electrically locked in. He then operates the handle of the counting switch, seen in the centre of the top of the instrument in Fig. 1, and so brings the switch step by step to the reverse position; this process, through the interaction of a contact maker and a contact disc, the relations of which are determined by the number of key tickets left in the instrument, causes those tickets to be counted on the relay group already referred to. A signal is then transmitted to *B*, causing the eye-ball indicator to change from red to white, thus advising *B* that he can similarly manipulate the counting switch on his own instrument. This action transmits a series of signals back to *A*, corresponding to the number of key tickets in the *B* instrument, which again actuate the relay group at *A*. If the figure thus recorded represents the total number of key tickets—proving that all are in—the eye-ball indicator at *A* becomes white, showing that the counting process is complete. *A* now operates the hand plunger, sending a proving signal to *B* and releasing the lock on the staff in the "inactive" aperture there; *B* can now remove it and insert it in the "active" aperture, when traffic can begin to pass from *B* to *A*. To change the direction of traffic again and allow trains to start from *A* a similar procedure is gone through.

Fig. 2—Key ticket, with triangular shaped handle, for Wragby to Donington single-line section

The switching out of intermediate block posts is performed with the ordinary apparatus, and the train staff and key ticket instruments are not affected. The ordinary means of distinguishing between key tickets of different sections by varying the shape of their handles and using distinctive marking are, of course, adopted. The apparatus is understood to have given every satisfaction in service and to meet the conditions of certain sections of single line in a very economical manner.

Noise Reduction on the Underground

As the result of experiments conducted on various parts of the Northern Line in the neighbourhoods of Leicester Square, Tottenham Court Road, and Goodge Street, the London Passenger Transport Board has now adopted a standard form of noise absorption pad, and is equipping the section between Camden Town and Golders Green. The illustration alongside shows these noise absorption pads in position in the tube tunnel. The pads, which extend up to platform level, consist of perforated asbestos sheeting with noise absorbing material packed in the space between the sheeting and the tunnel wall

XUM

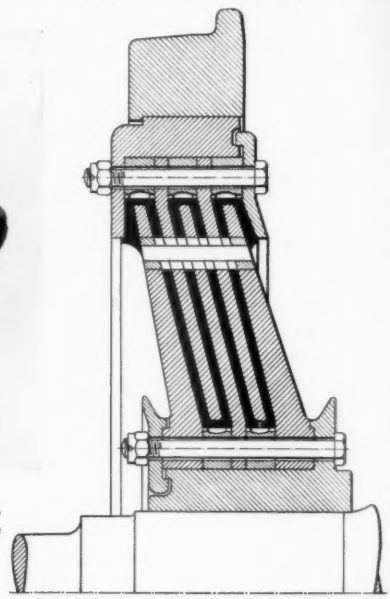
RAILWAY VEHICLE SUSPENSION

Details of the Metalastik system

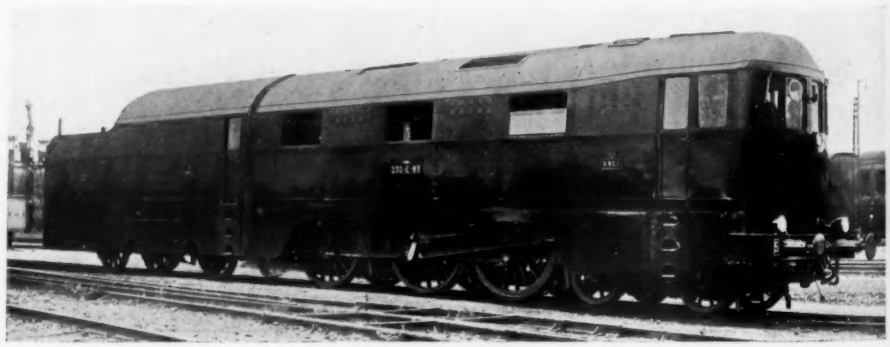
CONSIDERABLE improvements have been effected during recent years in railway vehicle suspension, more particularly as applied to passenger coaches. An interesting development in this field is the Metalastik railway wheel—a detachable unit designed to fit between the hub and the rim of the wheel itself, in the manner shown by the sectional drawing reproduced. The design is claimed to absorb the shocks and eliminate the noises that occur between the rails and the tyres, which, despite the tremendous advance of normal suspension systems, are still associated with railway travel. Another development is the application of Metalastik body mountings, which are designed to give effective sound and vibration insulation between the underframe and the bodywork of the coach. These body mountings have progressive load-deflection characteristics, giving an ease of suspension unobtainable with the straight line load-deflection characteristics of normal metal springs.

Numerous other Metalastik components are applicable to railway vehicles. An example is the Wireflex cushion and squab for carriage seating purposes, consisting primarily of an unbroken piece of woven wire of mesh varying in accordance with the specific duty the cushion or squab has to perform. Woven wire is worked into regular folds, each one bonded to top and bottom sections by the Metalastik process. In addition, and in order to ensure the progressive action of the entire element, the whole of the wire mesh is impregnated with rubber. It is stated that by the use of this method a considerable saving of weight is effected, and that the mesh, even after long use, will not take a permanent set. The cushions and squabs can be made to any profile, and to meet any demand put forward by the railway company.

A small but extremely important unit is the Metalastik bush, which consists of inner and outer metal bushes with rubber indivisibly bonded between them. After bonding, the rubber is in its free state, and therefore all its shock- and vibration-absorption qualities are ready to perform useful work. The term Metalastik aptly describes the range of products for which it stands, namely, rubber-to-metal-bonded components. The uses to which it can be applied are widespread, and have still wider application to railways than indicated in the examples quoted above.



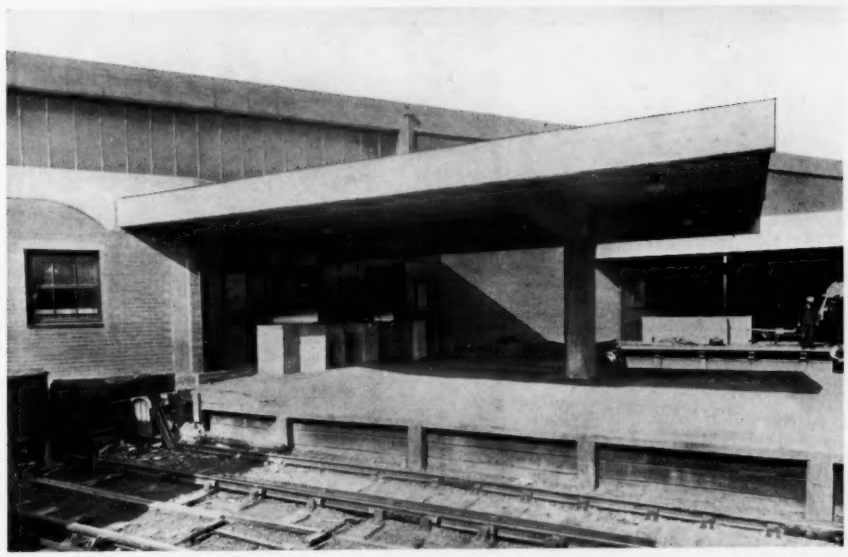
The sectional drawing on the right shows the Metalastik detachable wheel unit, and illustrated above is the Wireflex seat cushion, partly opened up to show method of construction



Locomotive No. 230.E.93, French National Railways, the rebuilding of which with a Velox steam generator in place of the orthodox boiler has increased its power by a third

(*See editorial article on page* 895)

Above : Outside view of new concourse and platform roofing



Right : Short protective roofing over platforms adjacent to concourse

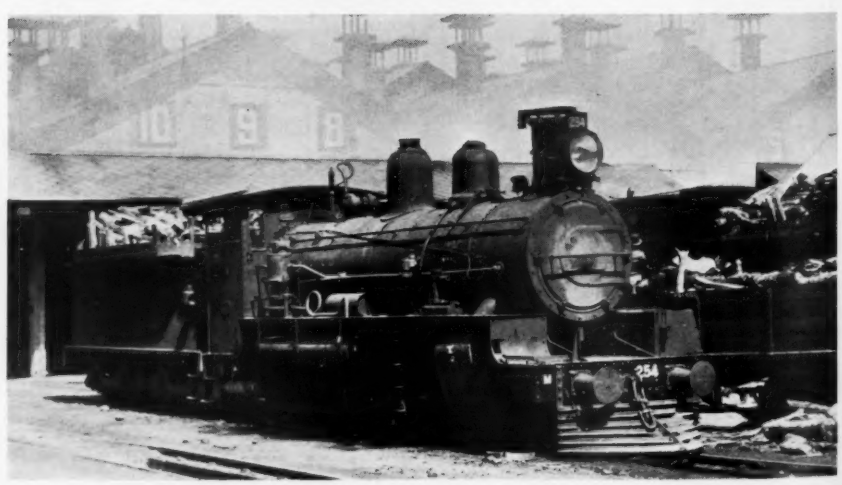
Below : Interior view of concourse with new reinforced concrete roof

REINFORCED CONCRETE ROOFS AT BLACKPOOL NORTH, L.M.S.R.

(*See article on page* 901)

The 1888 "Flying Scotsman" train being invaded by enthusiasts during its two days on exhibition at Alexandra Palace station, L.N.E.R., recently. The reappearance of Stirling's No. 1 has recalled to a correspondent a record run of 1895, to which he refers in a Letter to the Editor on page 897

Right: Train loads of wood fuel arrived at Mayne junction locomotive depot, Queensland Government Railways, during the recent Australian coal strike. The Q.G.R. then used one part coal to four parts wood fuel for firing all locomotives except tank engines and night sleeping car mail trains



Right: 4.8.0 type Q.G.R. locomotive and tender loaded with wood fuel and fitted with special spark arrester during the coal strike

(*See Overseas columns on page* 889)

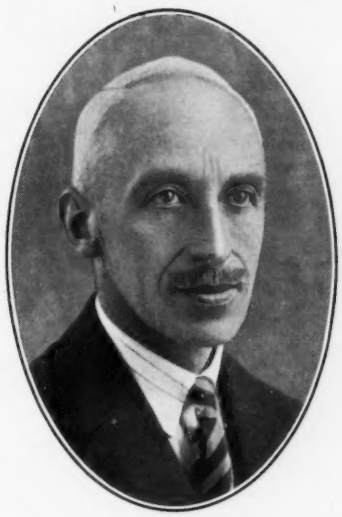
RAILWAY NEWS SECTION

PERSONAL

Mr. R. F. Harvey, who, as recorded in our issue of November 11, has been appointed Assistant Operating Manager, Glasgow, L.M.S.R., began his service with the former Midland Railway on October 2, 1908, as a pupil in that company's locomotive works, during which period he received technical training at the Derby Technical College. After passing through the various shops he had experience in the running sheds, including firing, and was transferred to Leeds as Assistant to the District Locomotive Superintendent on November 28, 1914, and to Kentish Town in a similar position on May 5, 1915. Later in the same year he joined the Royal Navy and served with the Grand Fleet as an electrical engineer until January, 1919, when he returned to Kentish Town as Assistant District Locomotive Superintendent. In January, 1922, Mr. Harvey was transferred to the District Control Office, Kentish Town, for further experience, followed in April of the same year by experience of the Head Office Control at Derby in both freight and passenger services. Mr. Harvey was appointed District Locomotive Superintendent, Worcester, on October 10, 1922, and was transferred to a similar position at Burton-on-Trent on July 18, 1923, taking over the North Stafford and L.N.W.R. sheds in addition to the Midland. In April, 1927, he was transferred to Rugby as the District Locomotive Superintendent, and also took over the Chief Mechanical Engineer's repair shops at that depot. Mr. Harvey was moved to Edge Hill in a similar capacity on March 31, 1932, and to Manchester as Assistant Divisional Superintendent of Motive Power on January 9, 1934. In October of the same year he was appointed as Assistant to the Superintendent of Motive Power, Euston. In 1924, on the formation of the Supplementary Reserve, Royal Engineers (Transportation), Mr. Harvey raised one of the Workshop Companies and commanded it until 1929 with the rank of Captain, which rank he still holds in the Regular Army Reserve of Officers. Mr. Harvey is a Member of the Institution of Locomotive Engineers.

Mr. R. F. Harvey

Appointed Assistant Operating Manager, Glasgow, L.M.S.R.



Mr. R. White

Appointed District Locomotive Superintendent, Saltley, L.M.S.R.

Elliott] [& Fry

Mr. H. T. Bird

Appointed District Engineer, Boston, L.N.E.R.

Mr. R. White, who, as recorded in our issue of November 11, has been appointed District Locomotive Superintendent, Saltley, L.M.S.R., served an apprenticeship with the former Glasgow & South Western Railway, partly in the running sheds at Dumfries and partly at the workshops and drawing office, Kilmarnock. He joined the London Scottish in 1914 and served with that regiment throughout the war, spending the years 1916-18 in France. He received a Commission in 1915, attained the rank of Captain, and was decorated with the M.C. and bar. In 1919 Mr. White re-entered the service of the G. & S.W.R. in a supervisory capacity at Girvan. His subsequent appointments have been: Assistant Locomotive Foreman, St. Enoch, 1920; District Locomotive Foreman, St. Enoch, 1922; Assistant to District Locomotive Superintendent, Polmadie, Corkerhill, St. Enoch, 1928; District Locomotive Foreman, Ayr, 1930; Assistant to Divisional Superintendent of Motive Power, Glasgow, 1935. Mr. White's latest appointment, as District Locomotive Superintendent, Saltley, will take effect in February next year.

Mr. H. T. Bird, whose appointment as District Engineer, Boston, L.N.E.R., was recorded in our issue of November 11, is a Graduate in Arts and in Engineering of Trinity College, Dublin, and an Associate Member of the Institution of Civil Engineers. He resumed his studies after serving in France with commissioned rank in the Artillery during the war. Mr. Bird began his railway work in the Bridge Office of the L.N.E.R. at Liverpool Street, and after a short time entered the New Works Office of the Metropolitan Railway, where he was engaged on work in connection with the opening up of the widened lines at King's Cross. In 1924 he returned to the L.N.E.R., being appointed to a position in the New Works Office at Edinburgh, and left there to assume duties in the Construction Office of the same railway at King's Cross. While at King's Cross Mr. Bird was engaged for a short time in the office, but chiefly as Resident Engineer on New Works, among which were included the new up marshalling yard at Whitemoor, the Lea Bridge widening, the new bridge for the North

Circular Road at New Southgate, and the Gidea Park to Shenfield widening. In 1934 Mr. Bird was appointed Chief Assistant to the District Engineer at Leeds, and in March this year he was appointed Assistant District Engineer, King's Cross, which position he now vacates to take up his new appointment. Mr. Bird is at present serving in the 150th (L.N.E.) Railway Construction Coy. Royal Engineers (S.R.) with the rank of Captain.

Mr. E. M. Bywell retired from the service of the London & North Eastern Railway on September 22. Known all over the system and to many other railways for his activities as Editor of the *L.N.E.R. Magazine* and Curator of the York Railway Museum, all Mr. Bywell's appointments have been in the North Eastern Area. He began

Mr. E. M. Bywell
Editor "N.E.R. (later L.N.E.R.) Magazine", 1914-31, and Curator, York Railway Museum

his career at the Newcastle Forth goods station of the former North Eastern Railway in 1899, and a year later was transferred to the District Goods Manager's Office, Newcastle. During his period in that office Mr. Bywell indulged in journalistic work of various kinds, but particularly on railway subjects for newspapers and technical periodicals, including our associated monthly contemporary *The Railway Magazine*. When in April, 1911, Mr. Bywell was moved to the General Manager's Office at York, his ability in these directions led him to be appointed Assistant Editor of the *North Eastern Railway Magazine*. In 1914 he took over the editorship upon the retirement of Mr. F. J. Fulthorpe, and under his direction the scope of the magazine was widened to embrace at first Scotland, and ultimately the whole L.N.E.R. system. Mr. Bywell is an authority on railway history, and was responsible for compiling the index to the late Mr. W. W. Tomlinson's history of the North Eastern Railway, for which comprehensive work he receives a deserved tribute from the author in the preface. Mr. Bywell's enthusiasm as a railway historian and collector found full expression in the organisation of the Railway Museum at

Mr. G. S. Hussey
Appointed Assistant Outdoor Superintendent (New Works), Euston, L.M.S.R.

Mr. L. B. Shoppee
Appointed Assistant Outdoor Superintendent (Signalling), Euston, L.M.S.R.

York, of which he was made Curator upon its inception and still retains the honorary curatorship. On the occasion of the Railway Centenary Exhibition at Darlington in 1925, Mr. Bywell broadcast an account of its contents, and has also described the exhibits at the York museum. In 1931 the headquarters of the *L.N.E.R. Magazine* were transferred from York to King's Cross and Mr. Bywell then relinquished the editorship. He was appointed Mineral and Depot Agent at Starbeck, Harrogate, the position he held up to his retirement.

Mr. G. S. Hussey, M.C., A.M.Inst.T., whose appointment as Assistant Outdoor Superintendent (New Works), Chief Commercial Manager's and Chief Operating Manager's Office, Euston, L.M.S.R., was recorded in our issue of November 11, was educated at Berkhamsted School and entered the service of the former London & North Western Railway in 1907 as a Junior Clerk at Camden goods station. Later the same year he became an apprentice in the General Manager's Office and two years afterwards was transferred to the Passenger Trains Office of the Superintendent of the Line's Department. From 1910 to 1914 he was Confidential Clerk to three assistant superintendents of the line. In February, 1914, Mr.

Mr. W. C. Moore
Appointed Chief Assistant to the Chief Electrical Engineer, Southern Railway

Hussey was appointed a probationer and sent to Leighton Buzzard goods station for training in goods station working. On the outbreak of war he was recalled to Euston as Confidential Clerk to the Superintendent of the Line. In May, 1915, Mr. Hussey, who had previously spent 3½ years in the Officers' Training Corps and 5 years, 1908-13, in the London Scottish, was gazetted a Second Lieutenant in the Royal Engineers (Signals). He served in France with the Guards' Divisional and Brigade Signal Companies. After the third Battle of Ypres, Mr. Hussey, who was buried and gassed, was mentioned in despatches and gained the "immediate award" of the Military Cross. On recovery he was appointed Captain and Adjutant of "B" Signal Depot, Bedford. When demobilised, Mr. Hussey became Outdoor Assistant to the Superintendent of the Line at Euston, and later at Birmingham, and was appointed Chief Outdoor Assistant at Crewe, L.M.S.R., in 1922. He returned to

Euston in July, 1924, in the Welfare Department, and in 1927 became a Personal Assistant to the Vice-President, Finance and Services. In 1931 Mr. Hussey joined the staff of the Executive Investigation Office and in 1933 he was appointed Assistant (Job Analysis) to the Chief Officer for Labour and Establishment, which position he has vacated to take up the appointment of Assistant Outdoor Superintendent (New Works), Chief Commercial Manager's and Chief Operating Manager's Office, Euston.

Mr. L. B. Shoppee whose appointment as Assistant Outdoor Superintendent (Signalling), Chief Operating Manager's Office, Euston, L.M.S.R., was recorded in our issue of November 11, entered railway service in 1903 with the former London & North Western Railway. After training in various departments he was, in 1911, appointed Outdoor Assistant to the Superintendent of the Line, first at Chester and later at Crewe. Two years later he became Assistant District Traffic Superintendent at Chester. In 1915 Mr. Shoppee received a commission in the Royal Engineers (Railway Operating Division), proceeding to France in September of that year. During 1918 and 1919 he was employed at the War Office under the D.S.M.R. On his return to railway service Mr. Shoppee was appointed Assistant District Superintendent at Manchester, and in 1920 occupied a similar position at Euston (Southern District). He was appointed District Controller at Willesden in 1925. Mr. Shoppee became Assistant in the Signalling Section of the Chief Operating Manager's Department at Derby in 1929, and he was appointed Assistant (Signalling) to the Outdoor Superintendent, Chief Operating Manager's Department, in 1932, coming to Euston in that capacity when the headquarters of the department moved there in 1934.

Mr. W. C. Moore, whose appointment as Chief Assistant to the Chief Electrical Engineer, Southern Railway, was recorded in our issue of November 18, was educated at Barnsley Grammar School, and the Technical Department of the Sheffield University College. Afterwards he served for five years with the Oldham, Ashton & Hyde Electric Tramway Company, and subsequently for a further five years was Assistant Engineer with Raworth's Traction Patents Limited, working on the development of regenerative control equipment. Mr. Moore then joined the British Westinghouse Electric & Manufacturing Company, where he was engaged on the design of multiple-unit railway control apparatus. He was appointed Chief Draughtsman in the Electrical Engineer's Department of the former London & South Western Railway in January, 1913. In August, 1914, Mr. Moore joined the Army, and served for 4¾ years in the infantry and the Tank Corps, returning afterwards to the London & South Western Railway. In January, 1922, he was appointed Assistant Engineer to the Electrical Engineer's Department of the S.E. & C.R., and became Chief Assistant in April, 1923. In January, 1926, Mr. Moore was made Chief Assistant to the Electrical Engineer for New Works, Southern Railway.

PRESENTATION TO MR. J. R. MORRIS

At the Great Western Hotel, Paddington, on November 17, a presentation was made to Mr. J. R. Morris, whose retirement at the end of July last from the position of Superintendent of the Chester Division, after 50 years' service with the railway company, was recorded in our issue of July 22. The presentation, which took the form of an inscribed silver salver, together with a handbag for Mrs. Morris, was from the G.W.R. Superintendents' Conference, of which Mr. Morris had been a member since 1922, and the gifts were handed to him by Mr. F. R. Potter, Superintendent of the Line, in his capacity as Chairman of the conference.

Mr. Potter said he preferred to regard the occasion as a family gathering at which the conference might bid Mr. Morris "goodbye," not merely officially but also giving tangible expression of their appreciation of a happy and friendly association with him in their deliberations. All knew and admired Mr. Morris's outstanding qualities, and that the promotion of the best interests of the Great Western Company was his single-hearted purpose throughout a long and distinguished career. Mr. Morris was entering upon his retirement in full health and vigour, with hosts of friends, and the best wishes of all went with him for the full enjoyment of his leisure.

Mr. K. W. C. Grand, Assistant to the General Manager, said that as a former colleague of Mr. Morris in the Traffic Department he endorsed fully the appreciative remarks of the Superintendent of the Line; and during the proceedings a telegram was received from Sir James Milne conveying his personal good wishes to Mr. Morris.

Mr. E. A. Glayzer, Staff Assistant to the Superintendent of the Line, instanced Mr. Morris's generous and warm-hearted characteristics, and Messrs. F. G. Wainwright (Cardiff) and Trevor Roberts (Newport) as the senior active divisional superintendents present, also expressed their high regard for Mr. Morris, and the toast of his health was acclaimed enthusiastically.

Mr. Morris, in returning thanks, said he gratefully acknowledged the friendship and co-operation of everyone with whom he had been in contact during a long railway career. While it was unfortunately necessary for him to sever his association with the conference, he had to recognise that the march of time made retirement inevitable, and on this account he could say he was leaving the service with no regrets. Expressing the gratification and pleasure he felt on receiving their handsome gift he particularly desired to thank the conference for the compliment its members had also paid to his wife.

Mr. A. M. Wellington, Superintendent of the San Paulo (Brazilian) Railway, arrived recently in England on leave.

Mr. G. W. Wyles, Signal and Electrical Engineer, New Zealand Government Railways, who has spent about four months in Europe studying various technical questions, left England for New Zealand on November 21.

We regret to record the death of Mr. F. W. Noal, late Marine Superintendent Engineer of the London & North Eastern Railway. Mr. F. W. Noal joined the Great Eastern Railway as Marine Superintendent Engineer on April 12, 1912, and served in that capacity to the date of his retirement in July, 1937. Prior to his joining the railway company he had been Assistant Superintendent Engineer to the Houston Line of Liverpool.

Mr. J. E. Spear has been appointed Sales Manager, Engineering Division, of British Timken Limited, the well-known maker of roller and ball-bearings.

Mr. H. C. Tuffill, B.A., has been appointed to the position of Railway Representative to the company thus vacated by Mr. Spear.

The following bulletin regarding the health of Mr. Ashton Davies, Acting Vice-President, L.M.S.R., who is suffering from typhoid fever, was issued on Wednesday: "Mr. Ashton Davies is not quite so comfortable today. Temperature has risen a little. Generally, however, his condition is not unsatisfactory."

We regret to record the death in London on November 17, at the age of 81, of Sir George Whitehouse, K.C.B., M.Inst.C.E., the eminent railway engineer. George Whitehouse was born on July 26, 1857, and studied engineering at King's College, London. At the age of 20 he became an Associate of the Institution of Civil Engineers, and in 1886, when only 29, was prominently associated with the construction of the Bolan Railway in North-West India. He constructed the Uganda Railway, and was Manager and Chief Engineer from 1895 to 1903. He was created K.C.B. for his public work in 1902. Later, Sir George Whitehouse became Chief Engineer of the Central Argentine Railway, and of the Buenos Ayres & Rosario Railway.

XUM

The Fall in British Railway Traffics

Railway companies propose abolition of present merchandise classification, and repeal of publication requirements and undue preference legislation

Much has been said recently about the poor financial position of the railway industry, and it has long been realised that the British railways occupy a peculiar position in regard to the fixing of their rates which has become increasingly onerous with the rise of motor transport. In fixing rates and conditions for carrying merchandise the railways are bound by statutory controls and regulations which have lasted a hundred years and grown more rigid with age, and no other form of goods transport is subject to such restrictions or anything comparable with them.

Moreover, no other form of transport has or can have such basic duties and responsibilities to the State as those which the railways must bear at all times and more especially in times of national emergency. The railways feel that it will be impossible for them adequately to discharge these national services and duties unless they are now set free to put their house in order, and to run their business on business lines. In attempting this the railways have stated that they have no desire whatsoever to interfere with other transport services or with any other business, but merely want the opportunity to put themselves right so that they may be able to meet fair competition in a fair way.

Any fundamental change in the method of charging naturally involves the consent of Parliament, and accordingly it is suggested that a short Act is required this session. As a preliminary step, a deputation of chairmen and general managers of the main-line railway companies met the Minister of Transport on Wednesday last to discuss railway charges for merchandise traffic.

Memorandum to Minister of Transport

The deputation, which was led by Lord Stamp and included Sir William V. Wood, Sir Ronald Matthews, Sir Ralph Wedgwood, Mr. Robert Holland Martin, Mr. G. S. Szlumper, Lord Palmer, Sir James Milne, and Mr. G. Cole Deacon, handed the Minister at that conference the following memorandum:—

"During the last fifteen years the main-line railway companies have made various representations to the Government upon the legal disabilities under which they are operating in comparison with motor transport on the public roads. At no time have the railways asked for preferential treatment; they have merely asked that they should be given equal treatment with the road transport industry at the hands of Parliament.

"Legislation has eased some of the disabilities of the railways; but it has not touched the great differences between the Parliamentary control of the charges and conditions applicable to the conveyance of merchandise by the railways and the road hauliers respectively.

"The most recent representations of the railway companies were made to the Minister of Transport on May 24, 1938, when amongst other matters his attention was again drawn to the injury caused to the railways by the present one-sided control of charges for merchandise traffic. It is upon this aspect that the companies once more urgently request to be heard.

"In 1933 Parliament authorised the creation of the Transport Advisory Council, and in 1935 a committee of the council was set up to investigate the subject of "Service and Rates." The report was submitted to the Minister in July, 1937, and recommended certain steps towards the creation of a system of rates for the road haulage industry. No steps, however, have yet been taken by Parliament to implement this report.

"Since July, 1937, the situation has become seriously worse and meanwhile extensive propaganda has completely misrepresented the railway position.

"The effects of the unbalanced legal position are steadily accumulating, and the railway companies have now no alternative but to ask for early legislative steps to give them equality with other forms of transport. Partial remedies on the lines of those suggested in July, 1937, even if enacted in the present Parliamentary Session, would not become effective for a considerable period, and even when effective would not achieve equality of working conditions.

Railway Companies' Proposals

"The railway companies accordingly submit that: (*a*) The existing statutory regulation of the charges for the conveyance of merchandise traffic by railway, together with the requirements attached thereto, including such matters as classification, publication and undue preference, should be repealed; and (*b*) the railways, exactly like other forms of transport, should be permitted to decide the charges and conditions for the conveyance of merchandise which they are required to carry.

"Equality of conditions between all the various forms of transport having thus been achieved, it would be proper that any regulation which may in future be applied to any one form of transport should (in appropriate shape) be applied to all the others. To this the railways would, naturally, raise no objection.

"This equality would have the further advantage that it would permit Parliament to deal with transport charges generally without being hampered by endeavours to conform to a system of control which has applied for over one hundred years to the railways and was designed to deal with conditions no longer existent.

"The railway companies' proposals represent merely a further development of the claim which they have urged for many years, that they should be afforded equitable conditions of competition. They are not asking for preferential treatment or any form of artificial protection.

"The conditions of competition which have prevailed over the past fifteen years are inequitable, and are prejudicing the efficiency of the railways and their ability to meet the calls which are made upon them. This consideration is of especial importance having regard to the responsibilities which would fall upon the railways in the event of a national emergency. It is already evident that under emergency conditions the railways would be called upon to perform services of a far more comprehensive character than are required of them at the present time, and of a far more critical nature than would be expected of any other form of internal transport. It is submitted that no effort should be spared to see that equitable conditions are given during peace-time to a public service of such vital importance if it is to fulfil satisfactorily the responsibility which must inevitably fall upon it under conditions of emergency."

The Next Step

On Wednesday evening the Secretary to the Ministry of Transport made the following announcement: "The Minister of Transport this morning received the chairmen and general managers of the main-line railway companies, who represented to him the serious position of the railways in regard to traffics and revenues. They handed to him a memorandum setting out proposals for the repeal of the existing statutory regulation of the charges for the conveyance of merchandise traffic by railway, with a view to placing railways on an equality with other forms of transport in this connection. After discussion, the Minister asked the deputation to amplify their proposals in certain respects; when this had been done a further meeting would be arranged."

In an editorial article on page 894, we comment on the importance and urgency of the matter thus raised by the British main-line railway companies. The manifesto on the subject issued by the Railway Companies' Association appears on page 925.

Railway Companies' Association Letter

The following letter to the Editor of *The Times* (dated November 23) was published yesterday:—

"Sir,—We venture to ask for the hospitality of your columns on a matter of grave public interest.

"The railway industry of this country is necessary in peace-time, vital in war. It directly employs 600,000 men and women; it is founded on a capital expenditure of £1,200,000,000. This industry is at the present time giving a service to the public which, whatever its shortcomings, is more efficient as a whole and more closely adapted to the public requirements than at any previous time in its history. Nevertheless, circumstances are steadily reducing it to a point where it will be impossible longer to maintain that measure of efficiency in peace-time, and where it would be quite impossible for it to give the enlarged service in war-time which would certainly be demanded of it.

"The principal cause of this steady decline in the industry is road competition, and particularly in the carriage of freight.

"The railways have no feeling of grievance against this competition as such: indeed, they recognise its invigorating effect. They have expressed their view that traders should have free choice of the form of transport which they wish to employ. The railways have not sought in any way to be given a preferential position. They have no such preference; on the contrary, the scales are heavily and, as we submit, most unjustly weighted against our industry.

"Other forms of goods transport are free to decide for themselves, or to agree with their customers, what charges they should make for the services which they render. The railways have no such freedom. They are hampered and bound by a whole series of statutory restrictions and regulations which clog the operation of the machine, causing expense, irritation, and unnecessary delays.

"These restrictions may have been desirable at one time when the railways possessed a large measure of transport monopoly. They have no justification now when road competition extends to every class of commodity and every corner of the country.

"The railway industry urges that as a condition of its continued efficiency as a public service the whole of these restrictions should be withdrawn, and that it should be placed in exactly the same condition of freedom as other and competing forms of transport."

R. M. HOLLAND MARTIN, Chairman, Southern Railway; RONALD W. MATTHEWS, Chairman, London & North Eastern Railway; PALMER, Deputy Chairman, Great Western Railway; STAMP, Chairman, London Midland & Scottish Railway.

The Railway Companies' Association, Fielden House, Great College Street, S.W.1.

The Plight of Minor Railway Companies

Derwent Valley Light Railway,
General Manager's Office,
Layerthorpe station, York
November 23

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In view of the interest that has been aroused in connection with the deputation from the four main-line groups to the Minister of Transport, may I be allowed to say a few words on behalf of the minor railway companies? It may be a surprise to many to know that there are still in operation in this country, about twenty-five public railways, working independently of the four main-line groups. Many of these are light railways built under the Light Railways Act, 1896, and almost without exception, they are now in a far worse position than the grouped companies.

In a White Paper issued by the Ministry of Transport preliminary to the grouping arrangements being operative, it was stated: "Light railways must rely largely for their prosperity and development upon the goodwill and assistance of the main-line companies in whose districts they lie." Beyond this feeble recommendation, nothing whatever has since been done for the minor railway companies, and the main-line groups are undoubtedly not in a position to give much practical assistance, although the small lines are valuable feeders to them.

On the other side of the picture, small railways are bound by most of the regulations affecting railways, are forced to render their accounts in the same form as the large railways, and must supply the Ministry with statistical returns. In contrast to this, if anything on the "credit" side comes along, we are politely told it applies only to the grouped companies!

With regard to road transport competition, minor railways are very seriously placed, owing to their short length of line, the nearness of the ultimate markets, and the restricted scope of available commodities—in other words, what is lost on the swings cannot possibly be re-gained on the roundabouts. For this reason in recent years many small lines have ceased to exist, but those still remaining in operation claim to be fulfilling a public demand for rail transport in the district they serve, and are surely, in all fairness, entitled to consideration when matters of policy concerning railways are decided upon.

Yours faithfully,

S. J. READING
General Manager

Some Press Comments

The Times.—The claim must have the attention which it inherently demands. Railways have an indispensable place in our transport system. . . . The companies do not doubt their ability to recover financial health and strength if they are given the freedom which their competitors enjoy. . . . Never to be put in the second place is the public interest, which may be found to require a tightening of the conditions on which road services are allowed.

The *Daily Telegraph & Morning Post.*—With the demand for parity with the road hauliers there can be no quarrel in principle, for it is beyond doubt that the unilateral restriction upon the freedom of the railways in fixing their charges operates unfairly in favour of the road hauliers. . . . It is of the first importance to realise that the railways perform an indispensable function, and that the community therefore has the inescapable obligation of ensuring them such conditions as will enable them to pay their way.

The *Financial News.*—The railways, in fact, are threatened by a species of pernicious anæmia. The disease may be neither desperate nor incurable, but pills cannot remove it. It needs fundamental treatment. . . . There are many ways of cooking pigs, but before the community acquiesces in the railways' suggestion that burning down the house is the only effective method, it will demand to know more of the new building which they propose to raise.

The *Financial Times.*—It is to the national interest that a railway system of the highest efficiency shall be maintained, not only in normal times but still more in emergency. Ability to do so is lessened if capital cannot be readily obtained. The railway companies are badly handicapped in that respect by the precarious footing of their junior stocks, which must look for improvement to methods of increasing revenue far more than to prospects of lowering costs.

Daily Express.—The railways are asking for something that the public will never concede to them. They are asking that they should be granted the power to fix privately the charges and conditions for the conveyance of merchandise. . . . If we conferred that right upon the railways, there would be two rates, one for the rich and another for the poor.

News Chronicle.—The railway companies' claim must be carefully weighed and treated as a matter of urgency. But it may well be that the problem will prove insoluble until there is a nation-wide organisation of transport in which there will be established a community of interest between road and rail—both working in co-operation on a public or semi-public utility basis.

The Manchester Guardian.—The railways' shock tactis will at any rate compel the Government to make up its mind whether it wants to go back to a freer and less regulated transport industry or whether the net of restrictions is to be drawn tighter.

XUM

RAILWAY AND OTHER MEETINGS

Entre Rios Railways Co. Ltd.

The ordinary general meeting of this company was held on Monday last, November 21, at River Plate House, E.C., Sir Follett Holt, K.B.E., Chairman of the company, presiding.

The Chairman said that the report and accounts were encouraging, certainly in a year which gave such a bad deal to the more important railways in Argentina. Contrary to the experience elsewhere this company had fairly good wheat and linseed crops, with the result that the local traffic receipts were the best obtained since 1931-32. He had previously referred to the growing importance of the company's terminal in Buenos Aires, to which its trains were ferried 113 miles from Ibicuy. A further rise in traffic by this route took place last year, the goods tonnage being 212,000 and the number of livestock increasing to 205,000, which was evidence of the value of owning their own station in the capital of the Republic.

Formed 47 years ago to take over a small and almost derelict railway, in the process of years of consolidation and extension the company reached a good position and as late as 1930 was able to earn and to distribute 6 per cent. on the ordinary stock, with a substantial margin. In that year the severe losses and differences in exchange commenced and had continued since, totalling at the end of June last £685,000, a sum far in excess of the debit of the net revenue account. Following the exchange trouble came locusts to destroy the crops, and road competition to reduce the traffic which was left. Yet during these bad years knowledge had been gained to mitigate the effects of locust attacks, and the management had learnt by experience that the protection against road competition was to improve services and to lower rates and fares. Although the ton-mileage was the best for 18 years and the number of passengers carried a record, the cost in holding business against the roads had been heavy as compared with 1930; the average freight per ton-mile for goods and livestock was 30 per cent. less and the fares per passenger-mile 25 per cent. lower.

The policy of acquisition of railways by the State was not expected, for the time being at least, to be one of practical realisation, except maybe in certain zones where the State railways were already heavily involved as they were in Entre Rios. The State, for strategic and development reasons, had been for some years building lines of the 4 ft. 8½ in. gauge, mainly northward of this company's zone. The mileage completed or almost completed was just over one-half of the company's mileage, and connected with its system at Crespo near Parana and at Concordia, its headquarters. It was obvious that the State and the company's systems should be worked and developed hand-in-hand, and for this reason no doubt the subject was mentioned by the Government in a recent message to Congress, but nothing further had happened.

Continuing, Sir Follett Holt said:—"The present position undoubtedly is out of equilibrium. Argentines, who have not supplied any of the capital, possess the 100 per cent. benefit of the use of the railways. The London market, which judges only by the present rate of earnings, places today the value of the £256,000,000 of British capital employed at £83,000,000, or at a discount of 67 per cent., which we, who know the value of the physical assets and the service the railways render, consider is an unjustifiable position, and one which should not continue.

"In an endeavour to ascertain the wishes and the ideals of the Argentine Government, Mr. Eddy, in representation of the railways, has been in Argentina since last February, and now with respect I beg His Excellency the President graciously to nominate in return a representative to examine in London the position as we see it here, and such ideas and ideals as we too may possess."

The report was adopted.

RAILWAY AND OTHER REPORTS

Pullman Incorporated.—The dividend for the third quarter of 1938 is 25 c. a share. For each of the two previous quarters the dividend was 37½ c. a share.

Midland Railway Company of Western Australia Limited.—The directors have authorised a final payment of interest on the second mortgage cumulative income debenture stock, on account of the year ending June 30, 1938, at the rate of 3 per cent., less income tax at 5s. 6d. in the £, payable January 2, 1939, making with the interim payment of 2 per cent. on July 1, 1938, 5 per cent. for the year.

Samana & Santiago Railway Co. Ltd.—Revenue receipts for the year 1937 amounted to £17,265, a decrease of £679, or 4 per cent., in comparison with 1936, and expenditure was £22,208, against £22,359, leaving a debit balance of £4,943, compared with a debit balance of £4,415 on the 1936 working. Goods tonnage was 16,023 compared with 16,970, and the operating ratio rose from 124·6 per cent. to 128·62 per cent. 1937 was another bad year, due to the cocoa crop, on which the railway mainly depends for its revenue, having partially failed for the second consecutive time. The volume of all 1938 crops is expected to be large, and the cocoa, rice, tobacco, maize, and coffee tonnages should show substantial increases and provide improved earnings for the current year.

Taltal Railway Co. Ltd.—For the year ended June 30, 1938, receipts amounted to £39,090 and expenses to £40,759, leaving a loss on working of £1,669, compared with a profit of £3,837 for the previous year. After crediting miscellaneous receipts there is an available balance of £17,529, which suffices for the payment of a dividend of 1s. a share, leaving £5,529 to be carried forward. Notwithstanding the strict economy exercised over expenditure in all departments, compulsory increases in salaries and additional contributions payable under social laws, together with increases in wages, made a rise in working expenditure inevitable, and it is due to these uncontrollable factors, accounting for £3,235 of the net increase in working costs of £3,581, coupled with a reduction of £1,925 in gross receipts, that the loss of £1,669 on working has to be reported. Goods carried amounted to 110,436 tons, as compared with 122,498 tons, and the number of passengers decreased from 18,072 to 14,652.

London Midland & Scottish Railway Company.—The directors announce that recommendation of a dividend on the 5 per cent. redeemable preference stock (1955), which ranks *pari passu* with the 4 per cent. preference stock, is postponed until February 8, 1939.

Associated Equipment Co. Ltd.—A final dividend is recommended of 1s. per unit of £1 stock, free of tax, making 1s. 6d. per unit, tax free, for the year to September 30, 1938, approximately equal to 10 per cent., subject to tax. The total dividend for the previous year was at the same rate.

Electrical Switchgear & Associated Manufacturers Limited.—The directors recommend a final dividend of 10 per cent. on the ordinary shares, making 16 per cent. for the year to October 31, 1938, the same as for the previous year, but on an increased capital. Brookhirst Switchgear Limited, a wholly-owned subsidiary, is paying a final dividend of 14 per cent., making 23 per cent. for the year.

Birmid Industries Limited.—The directors are recommending a dividend at the rate of 10 per cent., plus a bonus of 2½ per cent., both less tax, on the shares of the company in respect of the year ended October 31, 1938, to include a full year's dividend and bonus on the 100,000 new shares issued early this year. The capital of the company was £585,000 as at October 31, 1937, and was increased by the issue of a further 100,000 shares in January, 1938. The dividend and bonus show no change.

NOTES AND NEWS

Leopoldina Railway Changes.—According to a Reuters message from Rio de Janeiro, President Varcas of Brazil has issued a decree placing under Federal control the contracts and concessions of the British-owned Leopoldina Railway with the States of Minas Geraes and Rio de Janeiro. It is understood in London that the decree should simplify the working of the railway and should also result in certain economies.

London Area Passenger Fares.—At a meeting of the Standing Joint Committee of the London Passenger Transport Board and the main-line railway companies, which was held on Thursday of last week, it was decided to recommend to the London Passenger Transport Board and the main-line railway companies that the necessary steps should be taken to provide for an increase of certain fares in the London Passenger Transport Area. We refer to this matter in two editorial notes on page 891.

Djibouti to Addis Ababa Railway Shares.—The hearing of the appeal lodged by Haile Selassie, former Emperor of Ethiopia, against the judgment passed by a Paris Court a year ago upholding the non-payment of dividends on his shares in the Djibouti to Addis Ababa Railway has again been postponed. The Appeal Court decided, on November 16, that owing to fresh complications caused by the French recognition of Italian sovereignty of Ethiopia, the hearing should be deferred for another fortnight.

Train Describers.—At a meeting in London on November 16 of the Institution of Railway Signal Engineers, a paper entitled "Train Describers" was read by Mr. J. E. Mott, Member. In the discussion the following took part: Messrs. R. Dell, H. H. Dyer, R. C. Woods, C. Carslake, F. J. Cousins, J. B. Griffiths, W. J. Sadler, A. Brown, and the President, Mr. G. H. Crook. The author showed some full-sized apparatus in operation, a number of lantern slides, and a film illustrating train describers in service at Romford and Gidea Park, L.N.E.R.

Mexican Railway Moratorium.—The directors of the Mexican Railway Co. Ltd. are seeking an extension of the present scheme of arrangement which expires early next year. It is proposed to defer interest payments on the 6 per cent. perpetual debenture stock until January 1, 1942; on the A stock until July 1, 1941; and on the 4½ per cent. second debentures and the B stock until April 1, 1942. After January 1 or April 1, 1942, as the case may be, issues may be made of A stock and B stock (both second series) in settlement of unpaid interest, and the date fixed for redemption of these issues is December 31, 1947. The scheme also provides for the postponement of the sinking fund for the redemption of the second debentures. Meetings to consider the scheme have been convened for November 30.

Felixstowe Passenger Pier.—The L.N.E.R. is to demolish its pier at Felixstowe which was formerly used by the river boats plying between Ipswich, Harwich, and Felixstowe. The pier, which has also been used by anglers, is now unsafe and it has been found necessary to close it. The demolition of the pier will not affect in any way the running of the L.N.E.R. ferry-boat services between Felixstowe, Harwich, and Shotley, as the vessels operating this service will continue to use the pontoon situated in Felixstowe dock.

Closing of Czech Line Ceded to Hungary.—Traffic has been suspended on the railway between the Roumanian towns of Halmei and Sighet, crossing the strip of territory recently ceded to Hungary by Czechoslovakia. According to a Reuters message, it is reported, but not confirmed in Bucharest, that part of the track in Hungarian territory has been taken up. Sighet, 50 miles east of Halmei on the former Czechoslovak frontier, is said to be threatened with a shortage of food, as it depends on the railway for its supplies.

The Engineers' Guild.—The Council of the Engineers' Guild has issued a booklet containing an exposition of the aims and activities of the guild, for the information of members and prospective members. The guild was founded in May of the present year, and its objects are to promote the status and interests of the profession, thus supplementing but by no means competing with the work of the engineering institutions. The guild aims to be an organisation of the whole engineering profession, and it is hoped and expected that in time its council will become the mouthpiece of all the engineers in the land. Branches will be formed, and one of the important aspects of the work of the guild will be the assistance given to entrants to the profession. The booklet is being issued, in the first instance, mainly in the London area, and communications may be addressed to the Honorary Secretary at 1, Central Buildings, Westminster, S.W.1.

Northern Ireland Traffics.—Passengers carried on railways wholly in Northern Ireland (including season ticket holders) in the first eight months of 1938 numbered 4,246,987, compared with 4,412,678 in the first eight months of 1937, and total passenger receipts fell from £216,530 to £212,347. Merchandise and minerals conveyed in the first eight months of 1938 were 330,051 tons, a decrease of 61,877 tons in comparison with the corresponding period of 1937; the number of livestock fell from 170,979 to 140,102, and the total goods traffic receipts from £143,484 to £124,699. On railways partly in Northern Ireland, the passengers in the first eight months of 1938 were 3,900,377, against 4,032,489 in the first eight months of 1937, but the total passenger receipts of £331,170 were £1,077 higher. Merchandise and mineral tons dropped from 617,812 to 598,953, and the number of livestock from 505,786 to 442,230. Total receipts from goods traffic were £394,227, against £412,953 for the first eight months of 1937.

Railway Developments in Iran.—The Finance Minister of Iran has presented a Bill to the Iranian Parliament for the appropriation of a sum equivalent to about £500,000 from Government reserve, to be expended (*a*) on the port of Bandar Shahpur, the southern terminal of the Trans-Iranian Railway on the Persian Gulf, and (*b*) on new railway construction works. In addition to the Qum-Anarek and Teheran–Tabriz lines, a third new railway is projected from Garmsa and Semnan. The Bill being unopposed, was referred to committee, according to Reuters. Another Trans-Iranian line, this time from west to east, is reported from the same source to be under construction, and the first section from Garmsa to Semnan is expected to be completed about March, 1939. The remainder of this line farther eastwards *via* Shahroud to Meshed, in the north-eastern corner of Iran, is at present under survey to Shahroud and about to be surveyed onwards to Meshed.

L.N.E.R. Superannuation Fund.—A Bill is to be promoted by the London & North Eastern Railway Company to authorise the establishment of a superannuation fund for certain of its employees. To this fund it is proposed to transfer (i) the members and moneys and assets of the North Eastern Railway Superannuation Fund, the Great Central Railway Pension Fund, the Great Eastern Railway New Superannuation Fund, the North British Railway Superannuation Fund, the superannuation fund established by Thompson McKay & Co. Ltd., and the provisional superannuation fund established by the company for persons entering its service since January 1, 1923; (ii) certain members and an equitable portion of the moneys and investments of the Railway Clearing System Superannuation Fund Corporation, the Great Northern Railway Superannuation Fund, and the North Eastern Railway (Darlington Section) Superannuation Society. It is also proposed to dissolve Thompson McKay & Co. Ltd., and to provide for the distribution of its assets, and to repeal Section 50 of the L.N.E.R. Act, 1923.

Forthcoming Meetings

Nov. 28 (*Mon.*)—**United Railways of the Havana and Regla Warehouses Limited** (Ordinary General), Winchester House, Old Broad Street, E.C., at noon.

Nov. 29 (*Tues.*)—**Central Uruguay Railway Co. of Monte Video Ltd.** (Annual), River Plate House, Finsbury Circus, E.C., at 12.30 p.m.

XUM

STAFF AND LABOUR MATTERS

Railway Wages

At a meeting held in London on Wednesday, November 24, the executives of the N.U.R., A.S.L.E.F., and Railway Clerks' Association, decided to refer their claims for improvements in rates of pay and conditions of service to the Railway Staff National Tribunal.

Railway Shopmen

The Trade Unions catering for Railway Shopmen met in London on Thursday, November 17, to consider the reply of the railway companies to the claims submitted by the Unions to the National Railway Shopmen's Council. The meeting was composed of executive representatives of all the unions that are parties to the shopmen's negotiating machinery. Mr. J. Marchbank, General Secretary of the National Union of Railwaymen, one of the unions involved, stated at the close of the meeting: "After a very exhaustive discussion it was agreed by an overwhelming majority that the employees should again seek a meeting of the full Shopmen's Council for the purpose of considering agreement being reached with the railway companies for reference to the Industrial Court of the full claims submitted by the unions."

Hours of Road Motor Drivers

The joint council for the retail distributive trades section of the road transport industry has made an application to the Minister of Transport for an Order varying the hours of drivers during the Christmas, 1938, trading period. The variation applied for is to the effect that the period of eleven hours laid down in Section 19 (1) (ii) of the Road Traffic Act, 1930, may be increased to twelve hours on not more than two days in each of the three weeks ending on December 17, 24, and 31, 1938, the variation to apply only to those engaged in the delivery of goods from retail shops and/or stores to their customers. The application has been referred to the Industrial Court before which it was heard on Wednesday last, November 23.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 46th Week			Totals to Date		
	1938	1937	Inc. or Dec.	1938	1937	Inc. or Dec.
L.M.S.R. (6,834½ mls.)	£	£	£	£	£	£
Passenger-train traffic	408,000	407,000	+ 1,000	24,092,000	24,086,000	+ 6,000
Merchandise, &c.	452,000	539,000	− 87,000	20,711,000	22,945,000	−2,234,000
Coal and coke	251,000	303,000	− 52,000	11,472,000	11,773,000	− 301,000
Goods-train traffic	703,000	842,000	−139,000	32,183,000	34,718,000	−2,535,000
Total receipts	1,111,000	1,249,000	−138,000	56,275,000	58,804,000	−2,529,000
L.N.E.R. (6,315 mls.)						
Passenger-train traffic	270,000	272,000	− 2,000	15,632,000	15,631,000	− 89,000
Merchandise, &c.	327,000	387,000	− 60,000	14,543,000	15,777,000	−1,234,000
Coal and coke	242,000	285,000	− 43,000	10,867,000	11,446,000	− 579,000
Goods-train traffic	569,000	672,000	−103,000	25,410,000	27,223,000	−1,813,000
Total receipts	839,000	944,000	−105,000	41,012,000	42,914,000	−1,902,000
G.W.R. (3,737 mls.)						
Passenger-train traffic	174,000	173,000	+ 1,000	10,137,000	10,207,000	− 70,000
Merchandise, &c.	187,000	211,000	− 24,000	8,567,000	9,266,000	− 699,000
Coal and coke	108,000	126,000	− 18,000	4,941,000	5,163,000	− 222,000
Goods-train traffic	295,000	337,000	− 42,000	13,508,000	14,429,000	− 921,000
Total receipts	469,000	510,000	− 41,000	23,645,000	24,636,000	− 991,000
S.R. (2,140 mls.)						
Passenger-train traffic	263,000	257,000	+ 6,000	15,103,000	15,128,000	− 25,000
Merchandise, &c.	60,500	66,000	− 5,500	2,806,000	2,938,000	− 132,000
Coal and coke	30,500	35,000	− 4,500	1,396,000	1,399,000	− 3,000
Goods-train traffic	91,000	101,000	− 10,000	4,202,000	4,337,000	− 135,000
Total receipts	354,000	358,000	− 4,000	19,305,000	19,465,000	− 160,000
Liverpool Overhead (6½ mls.)	1,203	1,227	− 24	62,382	59,856	+ 2,526
Mersey (4½ mls.)	4,329	4,201	+ 128	202,235	193,921	+ 8,314
*London Passenger Transport Board	573,900	550,200	+ 23,700	11,904,500	11,810,500	+ 94,000
IRELAND						
Belfast & C.D. (80 mls.) pass.	1,677	1,639	+ 38	115,483	119,288	− 3,805
,, ,, goods	443	464	− 21	20,135	22,530	− 2,395
,, ,, total	2,120	2,103	+ 17	135,618	141,818	− 6,200
Great Northern (543 mls.) pass.	8,300	7,900	+ 400	513,250	516,500	− 3,250
,, ,, goods	10,900	9,800	+ 1,100	423,550	439,100	− 15,550
,, ,, total	19,200	17,700	+ 1,500	936,800	955,600	− 18,800
Great Southern (2,076 mls.) pass.	27,318	26,706	+ 612	1,701,384	1,697,746	+ 3,638
,, ,, goods	57,016	60,148	− 3,132	1,891,455	1,950,029	− 58,574
,, ,, total	84,334	86,854	− 2,520	3,592,839	3,647,775	− 54,936

* 21st week (before pooling)

British and Irish Railway Stocks and Shares

Stocks	Highest 1937	Lowest 1937	Prices Nov. 23, 1938	Prices Rise/Fall
G.W.R.				
Cons. Ord.	67⅝	55¼	28	+½
5% Con. Prefce.	127	108	84	−6½
5% Red.Pref.(1950)	113	109	97½	—
4% Deb.	113⅝	102½	101½	−1
4¼% Deb.	118	106	102½	−2
4½% Deb.	124½	112	110½	—
5% Deb.	136½	122¾	122½	—
2½% Deb.	76	64	66½	—
5% Rt. Charge	133 7/16	118	118½	—
5% Cons. Guar.	133¼	116½	108	−4½
L.M.S.R.				
Ord.	36⅛	25⅜	12½	+¼
4% Prefce. (1923)	82½	65¼	26½	—
4% Prefce.	92½	77¼	47½	−1
5% Red.Pref.(1955)	107¼	102	74½	−2
4% Deb.	108	99¼	94½	−3
5% Red.Deb.(1952)	117½	111	108	—
4% Guar.	104	95⅞	84½	−2
L.N.E.R.				
5% Pref. Ord.	12½	6¾	4¼	+⅛
Def. Ord.	6¼	3⅝	2¼	−⅛
4% First Prefce.	79½	63	24½	—
4% Second Prefce.	31½	21	10	—
5% Red.Pref.(1955)	101¼	89¾	45½	—
4% First Guar.	103	91⅞	72½	−5
4% Second Guar.	97⅝	85½	55½	−2
3% Deb.	84⅛	74	68½	−1
4% Deb.	107¼	98½	90½	−2
5% Red.Deb.(1947)	113½	106½	106½	—
4½% Sinking Fund Red. Deb.	110 5/16	105½	105½	—
SOUTHERN				
Pref. Ord.	98⅝	83½	58	+2
Def. Ord.	27⅞	16¾	13½	+½
5% Pref.	126 1/16	105 13/16	94½	—
5% Red.Pref.(1964)	118	110¼	100½	—
5% Guar. Prefce.	133¾	116¾	114½	—
5% Red.Guar.Pref. (1957)	118½	111½	111½	—
4% Deb.	112	101¼	102½	−1
5% Deb.	135¼	123½	122½	—
4% Red. Deb. 1962–67	113	105	106½	+1
BELFAST & C.D.				
Ord.	5	4	4	—
FORTH BRIDGE				
4% Deb.	106	99½	100½	—
4% Guar.	105¾	99	99½	—
G. NORTHERN (IRELAND)				
Ord.	11	5	3½	+½
G. SOUTHERN (IRELAND)				
Ord.	50	21½	15	—
Prefce.	61	34	17	—
Guar.	94¾	69½	39	+1
Deb.	95	82⅛	56½	−1½
L.P.T.B.				
4½% "A"	123¾	110½	110½*	−3
5% "A"	135	121½	118½*	−3
4½% "T.F.A."	108¾	104	104½	—
5% "B"	125	114½	113½*	−2
"C"	99¾	75	79	+4
MERSEY				
Ord.	42⅝	22	20	—
4% Perp. Deb.	103	96¾	97½	—
3% Perp. Deb.	77⅝	74½	71½	—
3% Perp. Prefce.	68¾	61¼	55	—

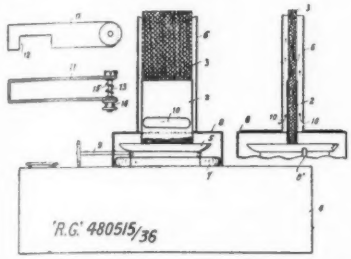
* ex dividend

ABSTRACTS OF RECENT PATENTS*

No. 480,515. Flickering Signal Lamps

O. M. C. Marischal, of 24, Rue du Maréchal Foch, Saint Die (Vosges), France. (*Convention date : October* 14, 1936.)

A flickering flame burner for use in signal lamps comprises a wick tube 2 surrounded by an incombustible sheath 6 having air inlets 10 in its

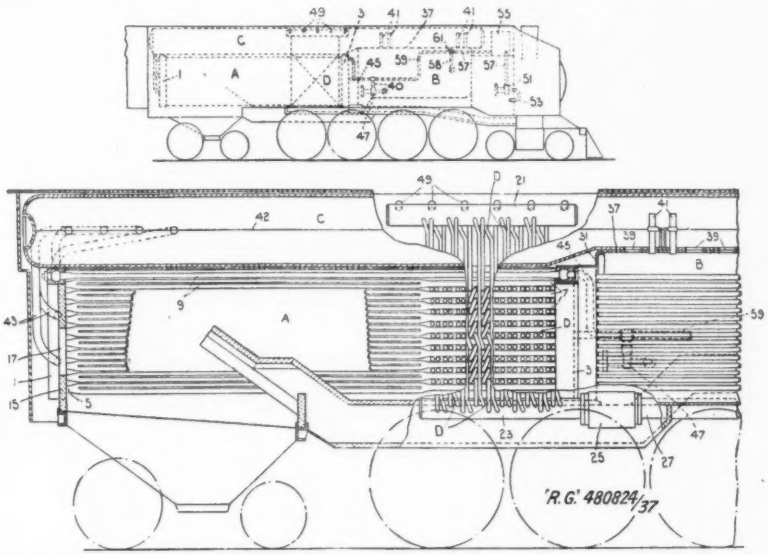


lower portion. The wick 3 is raised by an adjusting rod 9 until level with the top of the sheath 6 before being ignited. The air supply is then adjusted until flickering of the required frequency occurs by moving a notched stirrup 11 over the inlets 10. The stirrup may be clamped in position by a screw and nut 14. The sheath 6 is made with a cylindrical base 8 fitting over a ring 7 securing the wick tube to the fuel reservoir 4. The burner may be used in a signal lamp comprising a sheet-metal casing of truncated pyramidal form. The lamp casing is fitted with coloured lenses and has on its lower surface a socket for the passage of a securing screw.—(*Accepted February* 23, 1938.)

No. 480,824. Locomotive Boilers

The Superheater Co. Ltd., of Bush House, Aldwych, London, W.C.2 (*a communication from The Superheater Company, of* 60, *East* 42*nd Street, New York, U.S.A.*). (*Application date : January* 28, 1937.)

In a locomotive boiler having a water tube firebox *A*, and a steam and water drum *C*, extending over the firebox and the barrel *B*, water is forced by a pump 47 from the barrel through the firebox tubes in excess of the quantity evaporated therein, and the excess water is returned from the drum through apertures in the bottom of the drum and the top of the barrel. Tubes 41 conduct steam from the barrel to the steam space of the drum. Horizontal bifurcated tubes 9 arranged along the side walls and top of the firebox are connected to front and rear headers 3, 1, and the relatively long single tube portions 7 at the forward end of the wall tubes serve to support the horizontal loops of superheater elements *D*. The elements are connected to upper and lower steam drums 21, 23. Feedwater is supplied to the barrel by a pump 51 through pipes 57, 58 and a three-way valve 61

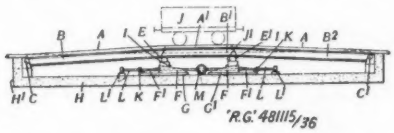


which, when the circulation pump 47 fails, is turned to allow feedwater to flow directly through a pipe 59 into the front header 3 of the firebox section.—(*Accepted March* 1, 1938.)

No. 481,115. Railway Sidings

*W. A. Stanier, Chief Mechanical Engineer, L.M.S.R., and T. F. B. Simpson, of the Chief Mechanical Engineer's Department, both of Euston station, London, N.W.*1. (*Application date : September* 4, 1936.)

The hump of a railway siding comprises a crown section *A'* and two pivoted ramp sections *A*, and the sec-

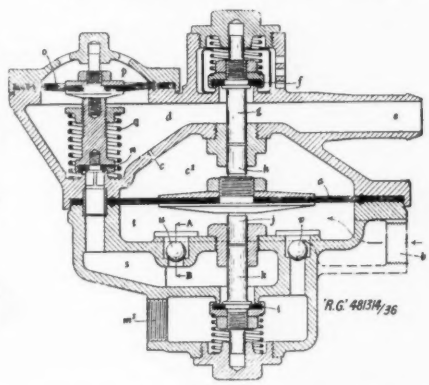


tion *A'* is vertically adjustable by pairs of opposed wedges *F*, *F'* sliding on plates *G*, *G'* and acting on wedge blocks *I* supporting the section *A'*. The hump is arranged over a pit *H* enclosing the wedge gear and its actuating mechanism, which comprises a motor *M* driving through worm gearing a shaft *L* having screw and nut engagement with cross-heads *K* connected to the wedges.—(*Accepted March* 4, 1938.)

No. 481,314. Third Pressure Brakes

Gresham & Craven Limited, of Ordsall Lane, Salford, 5, *Lancashire, J. N. Gresham, C. Arnold, and G. C. Marsh, all of the company's address.* (*Application date : December* 9, 1936.)

In an automatic vacuum brake air is admitted directly from the atmosphere to the brake cylinder on brake application in proportion to the increase in train pipe pressure and a reservoir under high vacuum is connected to the brake cylinder in release by a control fitting comprising valves operated by a single



diaphragm acted on by train pipe and brake cylinder pressure. The chamber *t* is connected to the train pipe and the chambers *d*, *c'* to the brake cylinder. Rise of pressure in the chamber *t*, on brake application, raises the diaphragm *a* which opens the atmospheric valve *t*, admitting atmospheric air to the brake cylinder through the chamber *d*. This air entering the chamber *c'* through a restricted orifice *c* acts on the other side of the diaphragm *a* and recloses the valve *f* at each stage of the increase in train pipe pressure. Decrease of pressure in the chamber *t*, on brake release, depresses the diaphragm *a* and opens a valve *i* to connect a vacuum

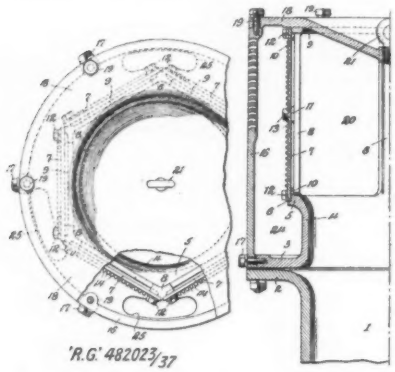
* These abridgments of recently published specifications are specially compiled for THE RAILWAY GAZETTE by permission of the Controller of His Majesty's Stationery Office. Group abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2. either sheet by sheet as issued, on payment of a subscription of 5s. a group volume, or in bound volumes, price 2s. each, and the full specifications can be obtained from the same address price 1s. each

reservoir connected at *m* to the brake cylinder by means of a reducing valve *n* which ensures a lesser vacuum in the brake cylinder than in the vacuum reservoir. The brake cylinder and reservoir are evacuated through the check valves *u*, *v*.—(*Accepted March* 9, 1938.)

No. 482,023. Steam Drier for Locomotives

P. Pascale and Novo Vale Corporation, both of 70, *East* 45*th Street, New York, U.S.A.* (*Application date: April* 23, 1937.)

Steam driers, for removing moisture from the steam before it passes to the superheaters or cylinders, comprise a number of plates 7 having numerous

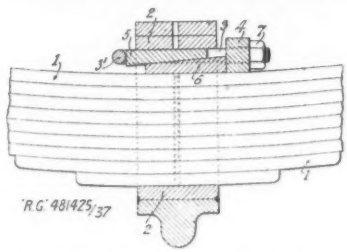


protruding nozzles 14 and arranged about a common axis to form a many-sided body interposed between an inlet and outlet and forming in a casing 16 an outer chamber 24 and an inner chamber 20 which communicates with the outlet 1. The drier plates, which may be of curved or other shape, are connected to a frame made up of upper bars 9 and posts 8 mounted on a flanged ring 4. The nozzles have openings diverging inwardly towards the outlet. The upper part of the casing 16 has circumferential slits formed by vanes 22 arcuate in cross section so that steam is directed downwardly against the plates and water drains to the bottom of chamber 24 and thence through openings 25 and valved drain pipes into the boiler.—(*Accepted March* 22, 1938.)

No. 481,425. Improvements in Leaf Springs

D. R. M. Yates, O.B.E., of Highclere, Chislehurst, Kent. (*Application date: January* 19, 1937.)

In a laminated spring used for vehicle suspension the leafs are embraced by a strap or buckle 2 between which and



the outside leaf two wedges 5, 6 are interposed and are embraced by a U-bolt 3 which passes through the buckle and carries a block 4 adapted to abut one edge 6 so that tightening of the nuts 7 increases the compression of the leaves. The base 3' of the U-bolt bears against the other wedge 5. The invention may be employed on the buckle described in Specification 470,066.—(*Accepted March* 11, 1938.)

COMPLETE SPECIFICATIONS ACCEPTED

480,040. Rheinmetall-Borsig A. G., Werk Borsig Berlin-Tegel, and Geissen, C. "Braking-arrangements for railway trains."

480,228. Kofler, G. "Means for actuating signals and brakes on trains from the track."

480,497. Bugatti, E. "Vestibules and like connecting structures for railway and like vehicles."

480,515. Marischal, O. M. C. "Signal lamps."

480,694. Lowell-Wintsch Automatic Train Control Inc. "Rail vehicle signal systems."

480,719. Automatic Electric Co. Ltd. (in liquidation), and Simpson, L. M. "Control and/or signalling systems for use on railways or the like."

480,790. Graham, J. H., and Westinghouse Brake & Signal Co. Ltd. "Apparatus for recording railway train or traffic descriptions or indications and the like."

480,824. Superheater Co. Ltd. (Superheater Company). "Boilers of the locomotive type."

480,910. Pollak, J. E. (Langshienen Ges.). "Railway rail joints."

481,057. Pinney, H. H. "Locomotive boilers."

481,115. Stanier, W. A., and Simpson, T. F. B. "Shunting humps for railway sidings."

481,226. Symes, S. J., and Lancaster, E. "Railway wagon pushing or shunting apparatus."

481,314. Gresham & Craven Limited, Gresham, J. N., Arnold, C., and Marsh, G. C. "Vacuum brake apparatus for railway and like vehicles."

481,425. Yates, D. R. M. "Leaf springs."

481,553. Union-Kupplung A. G. "Automatic couplers for railway or like vehicles."

482,278. Drewry Car Co. Ltd., and Wakely, W. J. "Self-propelled railway vehicles."

Are Railway Facilities Sufficiently Flexible?

The G.W.R. (London) Lecture and Debating Society held a debate with the Birmingham Society on November 10, the motion proposed by Birmingham being "That railway facilities are not sufficiently flexible to meet the requirements of the public." Mr. H. W. Payne, Principal Assistant to the Chief Goods Manager, presided.

Mr. D. R. Reese, of Small Heath, who proposed the motion, said that while it was true that railway facilities were more flexible today than ever, there were many instances of the necessity of their being more so. The good impression made by one-day transits between large towns was often destroyed by lengthier transits between smaller places. For goods in small lots, passenger trains should be used more. It was not always possible, because of pressure of work, to despatch goods on the same day as they were handed in by the public and then the case should be met by some expediting arrangement similar to the Green Arrow service. A good deal could be said about rates. A percentage reduction for very large quantities for which provision was not made at present, in standard and exceptional rates was desirable. Such a tapering scale would do something to meet public requirements. This was shown by the amount of traffic of this kind secured by the road haulier. Of course it was necessary for the value of the goods to be the prime determination of charges, but when, as sometimes happened, consignments which were of equal value and use to the trader were charged in different classes, the basis of charging needed to be more flexible.

Another annoyance to traders caused by the inability to collect goods because of the pressure of traffic would be obviated by more pooling of cartage strength between adjacent stations. Town cartage suffered by the rigidity of the fixed scale of charges, which meant that the charge for the lower class of goods was too high but a graded scale would suit the trader better. The railways should take a cue from the flexible methods of the big stores.

Mr. R. D. H. Jones, Office of Superintendent of the Line, in opposing the motion, said that flexibility of service could be considered only subject to securing a price which covered cost, to the economic stability of the railway. A very great degree of flexibility had already been reached, particularly on the operating side. There were the extra vehicles, divisions of trains and extra trains to meet the public demand at holiday and bank holiday times. The attention paid to this was witnessed by the voluminous extra train notices. As regards freight trains, the control system was calculated to secure the maximum flexibility in response to public demand, a special example being the coal traffic and the way in which the needs of every colliery were carefully followed.

The motion was seconded by Mr. F. W. Jones, Divisional Superintendent's Office, Birmingham, who said there was evidence of all kinds of inflexibility. Reservation of seats at provincial stations, inability to meet the exact demands of small parties,

the standardisation of concessions to promoters of guaranteed excursions, and so on. Vestibule coaches were now available, but the extra fee had diminished that advantage. The time limits imposed on ordinary, monthly, and tourist tickets caused more annoyance than they were worth. Another source of irritation would be removed if, when it had been proved that the trader had not received a parcel, the claim was paid and the article traced subsequently.

Mr. B. Seymour, Chief Goods Manager's Office, also opposed the motion and said that the railway was proving every day that it could go even beyond what the public wanted. Exceptional rates, agreed charges, traffic research, and so on, went very far in that direction. There were, too, many examples of the special fitting-up of wagons in order to take new kinds of articles. Consider, moreover, how greatly facilities had been extended towards the farmer and the manufacturer of liquids. The organisation was such that it could respond to any demand likely to occur in the future.

On a vote being taken the motion was lost.

Forthcoming Events

Nov. 26 (*Sat.*).—Stephenson Locomotive Society (Newcastle), at Y.M.C.A., 6.30 p.m. "Railway History, 1890–1900," by Mr. C. Hutton.

Nov. 28 (*Mon.*).—Engineers' German Circle, at Inst. of Mechanical Engineers, Storey's Gate, London, S.W.1, 6 p.m. "Die Zerstörungsfreie Werkstoffprüfung in Deutschland (Non-Destructive Testing in Germany)," by Dr. R. Berthold.

Institute of Transport (Scottish), at North British Station Hotel, Edinburgh, 7.15 p.m. Dinner.

L.N.E.R. Musical Society, at Hamilton Hall, Liverpool Street, London, E.C.2, 8 p.m. Concert.

Royal Society of Arts, John Street, London, W.C.2, 8 p.m. "Refractory Materials (11)," by Mr. J. Partridge.

Nov. 29 (*Tues.*).—Institute of Transport (London), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 6 p.m. "The Development of Air Mail," by Mr. D. Lumley.

L.N.E.R. (York) Lecture and Debating Society, at Railway Inst., Queen Street, 6.45 p.m. Lecture by the Rt. Hon. Lord Burghley, M.P.

Nov. 30 (*Wed.*).—Railway Students' Association (London). Visit to Smithfield Goods Depot, G.W.R.

Dec. 1. (*Thurs.*).—G.W.R. (London) Lecture and Debating Society, in General Meeting Room, Paddington Station, 5.45 p.m. "The Work of a Main Line Signalman," by Mr. F. Honeybone.

Institute of Transport (Nottingham Graduate) at Guildhall, 7 p.m. "Electrically Propelled Road Transport," by Mr. A. Ring.

Railway Club, at Royal Scottish Corporation Hall, Fetter Lane, London, E.C.4, 7.30 p.m. "The Hay Railway, 1810–1863," by Capt. F. Ellison.

Dec. 2 (*Fri.*).—Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, Parsons Memorial Lecture: "Sir Charles Parsons and Marine Propulsion," by Mr. S. Cook.

Omnibus Society, at Inst. of Marine Engineers, The Minories, London, E.C.3, 7 p.m. Display of Transport Films.

Dec. 3 (*Sat.*).—Stephenson Locomotive Society (Midlands-Northern), at 4, Bury Old Road, Manchester, 6.30 p.m. "The Sheffield and Rotherham Railway," by Mr. R. Taylor.

CONTRACTS AND TENDERS

The Société Anglo Franco Belge has received an order from the South African Railways & Harbours Board for 12 boilers for class "16," "16B," and "16C" locomotives.

Locomotives for India

The Vulcan Foundry Limited has received an order from the Bengal North Western Railway for six metre-gauge "YB" class 4-6-2 locomotives and tenders.

Electric Motor Coaches for India

The Metropolitan Cammell Carriage & Wagon Co. Ltd. has received an order from the Bombay, Baroda & Central India Railway Administration to the inspection of Messrs. Rendel, Palmer & Tritton for the supply of two steel third-class electric motor coaches to be fitted with British Thomson-Houston electrical equipment generally similar to those supplied by the same builders for the original electrification.

Wagons for South America

The Metropolitan-Cammell Carriage & Wagon Co. Ltd. has also received an order from the Dorada Railway for six convertible bogie cattle wagons and six bogie covered goods wagons, to be supplied to the inspection of Messrs. Freeman, Fox & Partners.

Improvements at King's Lynn

The L.N.E.R. has placed a contract with Fisher & Sons of Fakenham, for various improvements to King's Lynn station; King's Lynn is an important exchange point between the Midlands and the Eastern Counties. The booking office is to be equipped with a modern glazed front and improved lighting and heating. The booking hall and concourse are to be improved generally, the refreshment room being set back and the bookstall removed to allow more floor space. A new refreshment room will be provided nearer the buffer stops. Waiting rooms and lavatories are to be re-equipped and the electric lighting on the station buildings and platforms is to be generally improved. The work is to be completed by the end of March next.

The Crown Agents for the Colonies have recently placed the following orders:—

Stewarts and Lloyds Limited: Piping.

Wm. Asquith Limited: Radial drilling machine.

Sentinel Waggon Works (1936) Limited: Railcar spares.

United Steel Co. Ltd. (Workington Iron and Steel Branch): Rails and fishplates.

Waterproofing Co. Ltd.: Railway carriage roofing canvas.

Craven Bros. (Manchester) Ltd.: Reconditioning of second-hand wheel lathe.

Belliss & Morcom Limited: Self-contained turbo-alternator.

The Cargo Fleet Iron Co. Ltd.: Steel.

Stewarts and Lloyds Limited: Steel poles.

Guest Keen Baldwins Iron & Steel Co. Ltd.: Steel sleepers.

Steel Co. of Scotland Limited: Steel tyres.

Horseley Bridge & Thos. Piggott Limited: Struts, tie rods, clips, and turned bolts.

British Insulated Cables Limited: Telephone cable.

B. & S. Massey Limited has received an order from the Central Argentine Railway for one 10-cwt. size electric motor driven pneumatic power hammer.

The South Indian Railway Administration has placed orders to the inspection of Messrs. Robert White & Partners with Brown Bayley's Steelworks Limited for 30 locomotive tyres and with Thos. F. Johnson Limited for 1,750 carriage door locks.

The New York Car Wheel Company has received an order from the Entre Rios Railways for 350 chilled cast-iron wheels for 30-ton wagons.

The Bengal-Nagpur Railway Administration has placed the following orders:—

Steel, Peech & Tozer: 382 steel engine tyres.

Brown Bayley's Steelworks Limited: 380 steel engine tyres.

Hunslet Engine Co. Ltd.: One locomotive boiler for the Mourbhanj Railway.

English Steel Corporation Limited: Two crank axles.

Linley & Co.: Five copper firebox plates.

New London Transport Offices in Wandsworth

L. & W. Whitehead, Limited is to construct a new office block on the site of three derelict cottages in Marl Street, Wandsworth, as addition to the London Transport tram and trolleybus depot in Jews Row, Wandsworth. The extra accommodation has been made necessary by the progress of the conversion of tramways to trolleybus services. The block will contain conductors', inspectors', and cashier's rooms, a kitchen and servery on the ground floor, with a canteen and a staff room above.

G.W.R. Works to be Undertaken

Whitland.—Extensive improvements are to be effected at Whitland station. The scheme includes the construction of new station buildings on the up side, with a new booking hall and waiting room, while on the down platform a waiting room and modernised lavatory accommodation are to be provided. Widening and lengthening of both platforms at the west end are included in the proposals, while the down platform is being converted into an "island," so that working of the Pembroke and Tenby line trains will be expedited. New covering is to be erected on both platforms. The existing goods shed is to be demolished and a new shed and warehouse, and unified marshalling accommodation provided. A modern engine depot will be established on a new site at the Haverfordwest end of the station with improved coaling facilities, and a 65-ft. diameter turntable. Additional track circuiting is to be installed also.

Worcester (*Foregate Street*).—The street frontage and the premises within the station entrance are to be improved. A new wide circulating area within the entrance from Foregate Street will be formed, both sides of the area being lined with showcases, while two shops, with attractive modern elevations somewhat on the style of those provided at Paddington station, will be built on either side of the station bridge abutment, connecting up with a new booking office.

Bristol (*Temple Meads*).—Additional circulating space is to be provided in front of the parcels depot at Bristol (Temple Meads) station, and the building recently occupied by the Post Office is being demolished for the purpose.

XUM

LEGAL AND OFFICIAL NOTICES

THE MADRAS & SOUTHERN MAHRATTA RAILWAY COMPANY LIMITED invite Tenders for :—

1,159 tons (approx.) STEEL MATERIAL (comprising—M.S. Rounds, Flats, Squares, Angles, &c., approx. 751 tons, and M.S. Plates and Sheets, approx. 408 tons).

Specification and Form of Tender can be obtained at the Company's Offices, 123, Victoria Street, Westminster, London, S.W.1.

Fee ONE GUINEA, *which will not be returned.*

Tenders must be submitted not later than 2.00 p.m. on TUESDAY, 20TH DECEMBER, 1938.

The Directors do not bind themselves to accept the lowest or any Tender and reserve to themselves the right of reducing or dividing the order.

By Order of the Board,
V. CRASTER,
Secretary.

Buenos Ayres Great Southern Railway Company Limited

THE Directors of the Buenos Ayres Great Southern Railway Company Limited, hereby give notice that the Register of Debenture Stockholders of the Company will be closed from Saturday 26th November to Saturday 3rd December, 1938, both days inclusive.

By Order of the Board.
N. F. E. GREY,
Secretary.

River Plate House,
Finsbury Circus,
London, E.C.2.
23rd November, 1938.

FOR SALE.—Miniature Railway Business at popular seaside resort. Sound business, all equipment in excellent mechanical order. An opportunity to secure a good annual income with only seasonal working. Only genuine enquiries answered. Send 3½d. stamps for photograph and details.—Box No. 1911, c/o RAILWAY GAZETTE, 33, Tothill Street, S.W.1.

Buenos Ayres Western Railway Limited

THE Directors of the Buenos Ayres Western Railway Limited, hereby give notice that the Register of Debenture Stockholders of the Company will be closed from Saturday the 26th November to Saturday the 3rd December, 1938, both days inclusive.

By Order of the Board.
N. F. E. GREY,
Secretary.

River Plate House,
Finsbury Circus,
London, E.C.2.
23rd November, 1938.

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to :—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

QUESTIONS IN PARLIAMENT

Electrification in N.E. Cheshire

Mr. Trevor Cox (Chester, Stalybridge and Hyde—U.), on November 17, asked the Minister of Transport if he would approach the L.N.E.R. with a view to expediting the proposed electrification of its railway between Manchester and Woodhead, as this work would tend to lead to the industrial development of north-east Cheshire, and consequently find employment for many people in the district.

Dr. Leslie Burgin (Minister of Transport): I will convey my hon. friend's suggestion to the L.N.E.R. The electrification of this line is actively in hand.

Anglo-Argentine Railways

Sir Nicholas Grattan-Doyle (Newcastle-upon-Tyne North—C.), on November 21, asked the Prime Minister whether, in view of the failure of the London boards of the Anglo-Argentine railway companies to earn more than 2¼ per cent. on £277,000,000 of railway capital, of which £144,000,000 had not been allowed to earn a dividend for some years past, he would propose to the Argentine Government that they should buy the Anglo-Argentine railways at a price of their cost to British investors in return for Argentine Government sterling bonds or, alternatively, that the Argentine Government should relax the restrictions imposed upon the companies so as to allow them to earn a dividend of not less than 5 per cent. on the £144,000,000 of capital.

Mr. R. A. Butler: According to a recent statement from an authoritative Argentine source, the British companies concerned have submitted to the Argentine Government various suggestions for reform tending to remedy the situation, and the authorities are examining these with all good will to find an equitable solution within reasonable limits. His Majesty's Government, which is naturally interested in the welfare of the railway companies concerned, welcomes this statement. The Argentine Government is already aware of the hope of His Majesty's Government that a settlement satisfactory to both parties will be reached as soon as possible, and my honourable friend may rest assured that His Majesty's Government will continue to watch the situation in full consciousness of the importance of the British interests involved.

Railway Receipts

Sir Nicholas Grattan-Doyle, on November 21, asked the Prime Minister whether his attention had been directed to the serious falling off in the revenue of the railway companies; and whether, with a view to avoiding the consequences of continuous reduction of revenue, he would cause a Royal Commission to be appointed to ascertain the causes and to make recommendations for putting the railways upon a sound financial basis.

The Prime Minister (Mr. Neville Chamberlain): I am aware of the falling-off in railway receipts. I understand that my right hon. friend the Minister of Transport is receiving a deputation from the railway companies on Wednesday when this subject is to be discussed. In the meantime therefore it would be premature to take any decision as to possible future action.

Sir Frank Sanderson (Ealing—C.), on November 23, asked the Minister of Transport whether he was aware that goods traffic on our railways showed, instead of a gradual and steady annual increase, a decrease of 84 million tons this year compared with 1913; and if, in view of the gravity of the position and the large number of men employed on the railways, he would, in the national interest, take immediate action in regard to the uncontrolled road competition and in particular take such measures as might be necessary to restore to the railways the long distance traffic which they have lost.

Dr. Leslie Burgin (Minister of Transport): I am aware that there has been a serious falling off in goods traffic by rail during the last few months. The causes of this and the steps which it may be practical and desirable to take to deal with the situation, including the possibility of speeding up action to implement the recommendations of the Transport Advisory Council in its Report on Service and Rates, are receiving my earnest consideration. I have this morning met the chairmen of the railway companies, who have laid before me their views.

Captain W. F. Strickland (Coventry—C.), on November 23, asked the Minister of Transport (1) whether the weight of traffic of those classes of goods traffic distinctly competitive with road haulage had increased in 1937 from that of 1933; and, if so, by what amount of tonnage; and (2) whether he would inform the House in what class of goods the main decrease of railway haulage had taken place during the past few years; and whether this decrease included road-haulage carried out by the railways in those classes.

Dr. Leslie Burgin: The information in my possession on this subject is published in the Annual Railway Returns issued by my Department, and I would in particular direct my hon. and gallant friend's attention to pages 10, 14, 17, 22, 24, and 116-121 of the Returns for the year 1937.

Transport of Livestock

Mr. J. A. Parkinson (Wigan—Lab.), on November 23, asked the Minister of Transport if his attention had been called to the delay in, and the sufferings caused to, two consignments of pigs from Thuxston, Norfolk, to Crowthorne, Berks, a journey of less than 150 miles, which took approximately 48 hours; and if he would consult with the L.N.E.R. with a view to the transport of livestock receiving more expeditious and humane treatment.

Dr. Leslie Burgin: I have received representations in connection with the consignments referred to and am in communication with the railway companies concerned. I will let the hon. member know the result.

THE RAILWAYS ASK FOR A SQUARE DEAL

Much is being said about the poor financial position of the Railway Industry.

The real position can be stated in a few short sentences.

1. In fixing rates and conditions for carrying merchandise the Railways are bound by statutory controls and regulations which have lasted a hundred years and grown more rigid with age.

2. *No other form of goods transport is subject to such restrictions or anything comparable with them.*

3. Moreover, no other form of transport has or can have such basic duties and responsibilities to the State as those which the Railways must bear at all times and more especially in times of national emergency.

4. It will be impossible for the Railways adequately to discharge those national services and duties unless they are now set free to put their house in order, and to run their business on business lines.

5. *The Railways have no desire whatsoever to interfere with other transport services or with any other business.*

6. They merely want the chance to put themselves right so that they may be able to meet fair competition in a fair way. The main transport services should all start equal.

7. The time honoured shackles which fetter the Railways alone and well nigh strangle their goods traffic must go.

8. *And they must go before it is too late.*

9. A short Act of Parliament is required this Session to meet a crying national need.

The Railways ask for a Square Deal

ISSUED BY THE RAILWAY COMPANIES' ASSOCIATION

Railway Share Market

Although general conditions in the stock and share markets have been reactionary owing to a disposition to await developments in European political affairs, Home railway securities attracted rather more attention. Earlier losses in most of the junior stocks were more than regained and better demand was reported for guaranteed stocks and debentures.

The traffic figures were again depressing, but sentiment was influenced by the hope that the meeting between the Minister of Transport and representatives of the main-line companies may be followed before long by proposals of a satisfactory nature to prevent increasing competition from road transport. It is realised that no marked reversal of the current trend in traffic receipts can be expected until there is a revival in trade, but the general belief is that the position and outlook would be much better if adequate steps were taken by the authorities to equalise competition from road transport.

Great Western ordinary recovered an earlier sharp decline and transferred up to 28¾ on the assumption that, if there seem reasonable prospects of better results in 1939, the directors may, after all, be prepared to draw on reserves in order to pay a satisfactory dividend on this stock. A firmer tendency developed in Great Western preference stocks and debentures, although prices are little changed at the time of writing. L.M.S.R. 4 per cent. preference and 1923 preference have been a good deal more active at 47½ and 26½, respectively, while the 4 per cent. guaranteed moved up sharply to 84 and the 4 per cent. debentures were steady at 94½. Southern stocks were favoured in view of the benefits likely to be derived when there is an increase of fares in the London "pooled" area. The deferred rose to 13½ and the preferred to 58½, while the 5 per cent. guaranteed preference gained a point to 114. L.N.E.R. first and second preference at 24½ and 10¼ have participated in the better tendency, as have the first guaranteed at 73½ and the second guaranteed at 55½, while buyers were in evidence for the 3 per cent. and 4 per cent. debentures in view of the apparently attractive yields. As in the case of other Home railway securities, however, demand was a good deal less than might be deduced from the sharp rally in prices shown in the middle of the week. The rally has been due in part to a marking up of values as a precautionary measure by jobbers, awaiting any steps that may be taken by the authorities to check the serious fall in the railways' traffics. London Transport "C" was in request on more hopeful views as to the dividend outlook, and the price recovered to 79.

Argentine railway securities have been a better market this week owing to confirmation that the railways will continue to benefit from preferential treatment in the matter of exchange remittances. Following a fairly general improvement, however, there was a partial reaction in ordinary and preference stocks, particularly those of B.A. Great Southern and Central Argentine, but debentures remained firmer and were in request because of the generous yields. Canadian Pacific became firmer at 6⅝, but American railway shares generally were reactionary with the trend of Wall Street.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1937-38	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1937	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1937	Prices: Lowest 1937	Prices: Nov. 23, 1938	Prices: Yield (See Note)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	20.11.38	16,000	– 5,830	47	692,230	776,320	– 84,090	Ord. Stk.	29	10¼	9	Nil
	Argentine North Eastern	753	19.11.38	9,169	+ 2,066	21	221,135	205,430	+ 15,705	,,	19¼	6	5½	Nil
	Argentine Transandine	—	—	—	—	—	—	—	—	A. Deb.	93½	60	80	5
	Bolivar	174	Oct., 1938	3,550	– 150	44	37,200	53,050	– 15,850	6 p.c. Deb.	9½	5	8½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	17	9	6	85/6
	Buenos Ayres & Pacific	2,806	19.11.38	79,218	+ 682	21	1,474,879	1,640,324	– 165,445	Ord. Stk.	17⅛	5½	4½	Nil
	Buenos Ayres Central	190	5.11.38	$115,900	– $11,900	19	$2,275,200	$2,674,500	– $399,300	Mt. Deb.	41½	18	16	Nil
	Buenos Ayres Gt. Southern	5,084	19.11.38	120,533	– 8,561	21	2,515,879	2,537,097	– 21,278	Ord. Stk.	33¾	13½	11½	Nil
	Buenos Ayres Western	1,930	19.11.38	44,975	+ 2,109	21	813,275	951,986	– 138,711	,,	31⅝	11¼	8½	Nil
	Central Argentine	3,700	19.11.38	102,993	– 6,393	21	2,100,351	2,670,719	– 570,368	,,	34¼	10⅝	10	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	20½	4½	3½	Nil
	Cent. Uruguay of M. Video	972	12.11.38	21,491	+ 2,755	20	336,050	314,674	+ 21,376	Ord. Stk.	6⅞	2	2	Nil
	Cordoba Central	1,218	—	—	—	—	—	—	—	Ord. Inc.	6¼	1½	3¼	Nil
	Costa Rica	188	Sept., 1938	28,168	– 973	13	74,983	78,446	– 3,463	Stk.	38	27	24	85/6
	Dorada	70	Oct., 1938	15,800	+ 1,100	44	163,800	154,300	+ 9,500	1 Mt. Db.	107	106	105	511/6
	Entre Rios	810	19.11.38	15,701	+ 4,187	21	322,318	279,538	+ 42,780	Ord. Stk.	19⅞	6	6	Nil
	Great Western of Brazil	1,092	19.11.38	13,600	+ 2,090	47	337,500	366,000	– 28,500	Ord. Sh.	¾	1⅛	1¼	Nil
	International of Cl. Amer.	794	Sept., 1938	$371,340	– $15,056	39	$4,189,954	$4,341,014	– $151,060	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	2/	1/-	1½	Nil
	La Guaira & Caracas	22¾	Oct., 1938	6,230	+ 2,075	44	53,110	51,820	+ 1,290	Stk.	8½	6	8½	Nil
	Leopoldina	1,918	19.11.38	26,616	+ 5,668	47	987,289	1,082,638	– 95,349	Ord.Stk.	9¼	3	2	Nil
	Mexican	483	14.11.38	$263,400	+ $26,400	20	$5,143,100	$5,779,900	– $636,800	,,	1½	¼	⅛	Nil
	Midland of Uruguay	319	Oct., 1938	9,090	– 181	18	34,073	33,065	+ 1,008	,,	1⅞	1½	1½	Nil
	Nitrate	386	15.11.38	4,622	– 4,693	46	126,914	135,662	– 8,748	Ord. Sh.	31/16	2	1¾	511/16
	Paraguay Central	274	19.11.38	$2,750,000	+ $25,000	21	$61,847,000	$65,473,000	– $3,626,000	Pr. Li. Stk.	84	79¼	57½	5½
	Peruvian Corporation	1,059	Oct., 1938	65,795	– 18,482	18	278,342	347,951	– 69,609	Pref.	14¾	4½	2¾	Nil
	Salvador	100	12.11.38	¢16,850	+ ¢3,940	20	¢223,789	¢242,394	– ¢15,605	Pr. Li. Db.	23½	21½	19½	Nil
	San Paulo	153½	13.11.38	28,200	+ 2,237	46	1,417,273	1,482,288	– 65,015	Ord. Stk.	98½	56	34	11¾
	Taltal	160	Oct., 1938	3,885	+ 1,070	18	11,785	12,885	– 1,100	Ord. Sh.	17/16	11/16	5/8	16
	United of Havana	1,353	19.11.38	12,579	– 1,766	21	329,868	343,852	– 16,984	Ord. Stk.	5⅝	31/32	1	Nil
	Uruguay Northern	73	Oct., 1938	1,119	+ 157	18	3,900	3,382	+ 518	Deb. Stk.	10	2	2	Nil
Canada	Canadian National	23,723	14.11.38	770,216	– 847	46	31,627,127	34,665,416	– 3,038,289	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	– 4 p.c.	Perp. Dbs.	77	62½	70½	511/16
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	101⅞	94½	101 1/8§	315/16
	Canadian Pacific	17,186	14.11.38	589,000	– 26,400	48	24,697,800	25,192,000	– 494,200	Ord. Stk.	18	7¼	6½	Nil
India†	Assam Bengal	1,329	31.10.38	56,430	+ 8,902	29	848,360	783,609	+ 62,751	Ord. Stk.	86	73½	78½	313/6
	Barsi Light	202	31.10.38	5,212	+ 2,557	29	84,112	72,802	+ 11,310	Ord. Sh.	66½	46	58½	613/16
	Bengal & North Western	2,116	31.10.38	68,784	– 12,579	4	207,568	211,227	– 3,659	Ord. Stk.	317	301	284	65/8
	Bengal Dooars & Extension	161	10.11.38	5,465	+ 479	30	93,273	91,508	+ 1,768	,,	100	84	87½	77/16
	Bengal-Nagpur	3,268	31.10.38	197,475	+ 1,989	29	3,929,513	4,014,049	– 84,536	,,	101	89	94½	4¼
	Bombay, Baroda & Cl. India	3,085	10.11.38	238,650	+ 27,300	30	5,198,025	5,258,850	– 60,825	,,	113	110½	108½	5½
	Madras & Southern Mahratta	2,957	31.10.38	152,025	+ 7,080	29	3,169,368	3,034,847	+ 134,521	,,	110	105	103 1/8§	83/16
	Rohilkund & Kumaon	571	31.10.38	12,162	– 575	4	37,400	37,550	– 150	,,	314	302	287	6¼
	South Indian	2,531¾	31.10.38	106,581	– 19,491	29	2,438,134	2,461,166	– 23,032	,,	103½	99½	102½	4⅝
Various	Beira-Umtali	204	Sept., 1938	83,497	– 14,556	52	1,037,185	975,721	+ 61,464	—	—	—	—	—
	Egyptian Delta	620	31.10.38	8,739	– 2,063	29	128,467	138,048	– 9,581	Prf. Sh.	31/	5¼	1½	Nil
	Kenya & Uganda	1,625	Aug., 1938	182,150	– 14,527	35	1,860,357	1,920,155	– 59,798	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	48⅛	43½	45½	711/16
	Midland of W. Australia	277	Sept., 1938	17,029	+ 2,026	13	44,686	37,926	+ 6,760	Inc. Deb.	98	93½	90	4⅞
	Nigerian	1,900	15.10.38	29,154	– 18,298	29	849,926	1,345,628	– 495,662	—	—	—	—	—
	Rhodesia	2,442	Sept., 1938	410,764	– 21,548	52	4,950,384	4,635,398	+ 314,986	—	—	—	—	—
	South Africa	13,285	12.11.38	649,623	– 9,031	33	20,086,027	20,830,088	– 744,061	—	—	—	—	—
	Victoria	4,774	Aug., 1938	762,903	+ 61,343	9	1,479,248	1,421,092	+ 58,156	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16

† Receipts are calculated @ 1s. 6d. to the rupee § ex dividend

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements are based on the current rates of exchange and not on the par value

Diesel Railway Traction

French Railcar Withdrawals

THE scarcely unfeigned glee which in certain quarters has greeted the withdrawal of some of the fast business railcar services of the French National Railways makes one wonder whether the methods of operating a railway have not degenerated into an undesirable end. There seems to be far more energy spent these days in upholding the steam locomotive as an end in itself than is devoted to studying the *raison d'être* of a railway and the principles of its organisation. Such a study, if conducted from fundamentals, would probably show that, of all available forms of motive power for mass transport on land, the steam locomotive was superior only to llamas, and that simply because it does not lie down if the load exceeds 100 lb. It is not simply railcar services which have been withdrawn in France. At the urgent request of the Minister of Public Works, who in an endeavour to make the railways pay their financial charges has already closed over 2,700 miles of line this year, steam services have been cut down appreciably, *and have in many cases been replaced by railcars*. That some of the business railcar services should not have proved remunerative in the last few months is natural. If the commerce and purchasing power of a great nation is to be cut down as it has been in France during the last 12 months or so, one of the first things to reflect it is travel. All that is being done now is to reduce transport services to suit the shallow pockets of the people, instead of deepening the pockets sufficiently to make purchasing power commensurate with the available real wealth of goods and services.

Fuel Oil Again

IT is not improbable that if customers insisted upon diesel engines being tested in the maker's works on the fuel or fuels they are to burn in actual service, and not simply on the fuel the maker may recommend or use himself, a great deal of what are now considered as normal maintenance troubles would disappear, particularly such faults as carbon deposits on the nozzles and sticking piston rings. Finding and using the correct or a thoroughly suitable fuel would be important in any case, but as very many engines are still not designed from a combustion point of view it is doubly important. Much useful information on the characteristics of fuels was given by Messrs. Broeze and Hinze in their paper "Diesel Engines and the World's Fuel Supply," read before the Diesel Engine Users' Association on November 9. It is a paper which should be read by every railway engineer with more than a handful of diesel locomotives and railcars in his charge. The authors have been wise enough to suggest what they consider to be essential points in any engine designed from the combustion aspect. They have considered the case of a medium-speed engine, which, from a railway point of view, would be a slow-speed unit; therefore their remarks in this particular direction apply not to the high-speed railcar engine. Their recommendations include the adoption of the supercharged four-stroke principle, using a mean effective pressure of about 115 lb. per sq. in. with a large excess of air; and the incorporation of a separate swirl-type combustion chamber with an insulated throat, which is relatively insensitive to changes in fuel volatility. A series of experiments with a combustion chamber of this form showed that even with fuels of boiler quality no hard carbon was formed in the cylinder proper, but in the authors' experience carbonisation cannot be entirely avoided in a direct injection engine when prolonged periods of running at low output alternate with periods of higher and more favourable loading. Fuel-cooled fuel nozzles almost eliminate carbon deposition on the nozzles, with a consequent regularity of atomisation and combustion right through the cycle to the exhaust, the temperature of which is maintained evenly instead of rocketing like a pheasant as it does with a normal arrangement of nozzles in indifferent condition. Finally, for the type of engine under consideration, the authors are in favour of cast-iron pistons, or of the aluminium type with cast-iron ring carrier and top land, and of oil-cooled pistons.

Railcars and Traffic Operation

ONE of the axioms of successful railway organisation is that the traffic department, in consultation with the commercial section, shall indicate its requirements to the mechanical department in order that the best type of motive power or rolling stock shall be produced. This is not always done, and even when it is, certain traffic departments have a habit of using the motive power or rolling stock on services totally different from those originally intended, naturally with indifferent results. It is essential to consider carefully the requirements of any proposed railcar service from both the commercial and technical aspects, and it will usually be found that there is no need for over-specialisation in the design and layout of the vehicle, and that one type will suit a large number of services. Moreover, still greater flexibility can be obtained by making some or all of the seats removable, as has been done in France. For example, one railcar having easily removable seats was used for the carriage of newspapers between Paris and Rheims in the early morning, with only a few of the seats in position; on arrival at Rheims the remaining seats were quickly erected and the car ran on to Charleville and then back to Paris as an ordinary passenger service. Such principles were among those discussed by Mr. Howard E. Pheasant, of the Buenos Ayres & Pacific Railway, in his paper "The Business Aspects of Railcars," read before the Argentine and River Plate centre of the Institute of Transport on September 30. This paper is a valuable one because of its constructive tenor. The experiences of the B.A.P. Railway with interurban railcar services over distances of 95 to 170 miles appear to have been eminently successful. On the Mendoza—San Rafael line, for example, the traffic and receipts were doubled within six months by the institution of railcars, and the operating expenses went down. One class accommodation was provided for this route, and Mr. Pheasant is very strongly in favour of an extension of this principle, which incidentally has contributed to the success of road and air transport. Indeed, if it was extended to the great majority of train services of all types it would considerably assist operation, and it would also further that type of standardisation which is not necessarily a bar to progress, and which cheapens both first and maintenance costs.

XUM

1,000-B.H.P. SHUNTERS FOR THE FORD PLANT

Two 118-ton locomotives with starting tractive effort of 75,000 lb.

APART from the technical features embodied, the most striking characteristic of the two 1,000-b.h.p. diesel-electric switching locomotives recently constructed in the shops of the General Electric Company (U.S.A.) for the Ford Motor Company, is the general appearance. In conformity with the modern urge to combine form and function with a view to artistry as well as to utility, the lines of these locomotives, the colour scheme and the trim details have been arranged to produce a machine that is outstanding among switching units for its attractive appearance. The two-tone colour scheme—vermilion engine-hood and operating-cab roofs, with a jet-black finish on the remainder of the locomotive—is nicely set off by the use of chromium trim in the window-framing, the handrails, headlights, hood decorations and in the owner's name and locomotive number. The radiator housings at the ends of the hoods have been finished in a manner similar to current automobile practice with grille-work framed in chromium-plated edging.

The severity of straight lines and sharp corners has been eliminated by a judicious use of fillets between the cab and the platform; by well-rounded corners on the engine-housings and the operating cab; and by the employment of a compound curve for the buffer beam at each end of the platform. Depth, with an air of solidity, has been given to the platform by the use of the apron which, at the centre, conceals the compressor, air tank, and battery assembly between the trucks and beneath the platform. The exhaust pipes have been provided with casings shaped to conform to the lines of the remainder of the locomotive. These casings, besides adding to the general appearance of the roof line, serve a utilitarian purpose as well. The annular openings surrounding the exhaust pipes proper act as engine-compartment ventilators, since heated air and fumes in the engine compartments are discharged through the tops of the casings under the impetus of the suction created by the discharging exhaust gases.

A smooth finish to the various surfaces comprising the exterior has been obtained by the use of welding and the elimination of riveting in practically all details. The use of colour and chromium trim has been carried into the operator's cab, where window frames, instrument panels, operating handles (throttles, reversers, air-brakes, sander valves), and even the aluminium seats for the operator, have been finished in chromium plating. The cab interior has been painted with a tan finish, which, in conjunction with the chrome trim, produces a general atmosphere of cleanliness and brightness.

Mechanical Structure

All-welded fabricated construction has been employed throughout the mechanical structure wherever possible. The truck-frames are constructed throughout of flame-cut rolled plate sections, arc-welded into a casting-like structure. Double-bar equalisers on each side of the frame transmit the locomotive weight to the journal-box castings. Four nests of springs, each composed of four double-coil helical springs, carry the superstructure and truck-frame weight to the equalisers. The transom member is a hollow fabrication forming part of the traction motor ventilating air duct system.

Clasp brakes, carrying two shoes for each wheel, are operated by individual (one for each wheel) brake cylinders. The journal boxes are of the cast steel pedestal type with manganese-bronze thrust plates for taking the end thrust of the axles. Solid rolled steel wheels with non-renewable treads are provided, and have a diameter of 40 in. They are spread over a base of 8 ft., and the bogies are pitched at 32 ft. 4 in. centres.

The underframe, like the truck-frames, is an integral all-welded steel structure in which castings are conspicuous by their absence. The cab is of the so-called steeple type with a central operating compartment flanked on each end by a bonnet housing the power plant equipment. Excellent visibility for the operator from either operating position is provided by the use of windows in all walls of the cab structure. The relatively narrow engine housings permit an unobstructed view of a switchman on

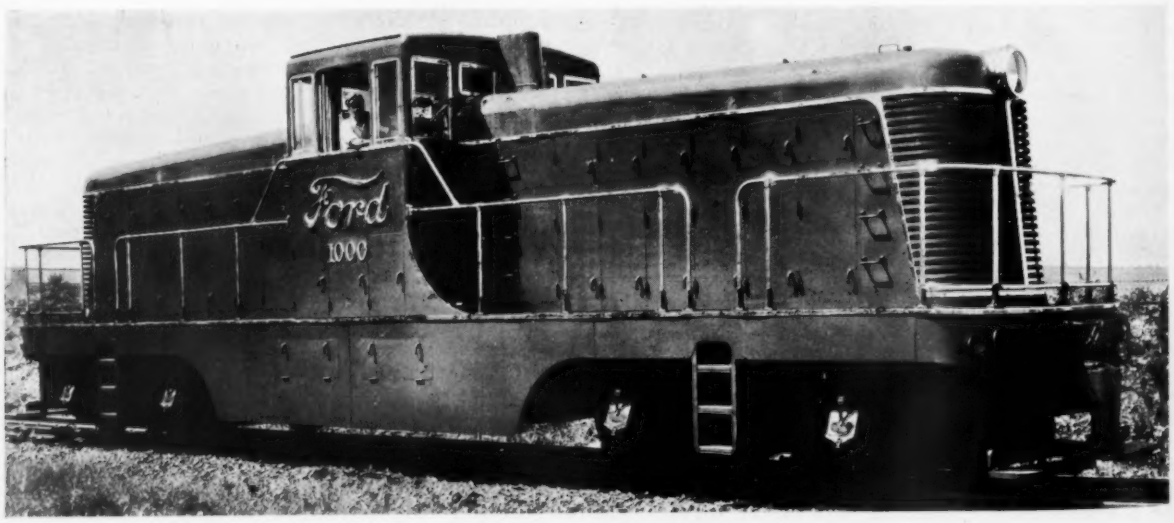


Fig. 1—General view of one of the diesel switchers at River Rouge plant

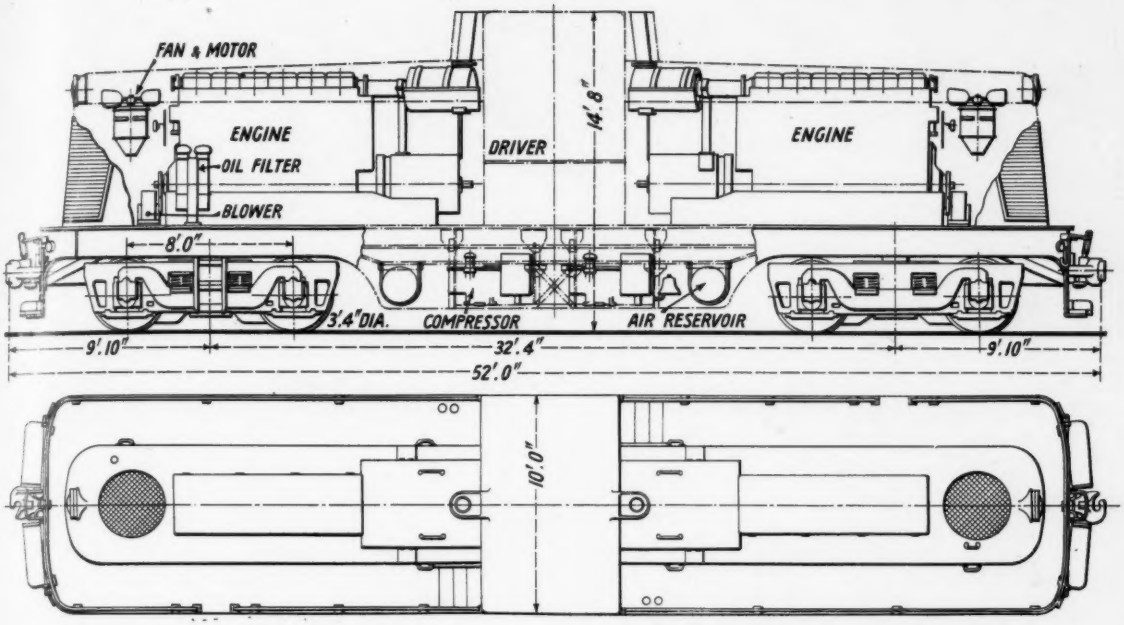


Fig. 2—Diagram of 1,000-b.h.p. locomotive showing layout of main equipment

the end-step directly in front of the operator's position, without the necessity of the operator leaning out the cab window. This arrangement facilitates the transmission and reception of switchmen's signals during coupling and other switching operations.

Comfortable conditions in the operating cab during cold weather are secured by the use of hot-water radiators taking heated water from the engine cooling systems. The radiators—one of which is located at each of the two operating positions—are equipped with small motor-driven fans which effect circulation of air through the radiators and about the cab interior. Access to the power plant equipment is gained through doors on both sides of each engine cab, and through hinged hatch covers located directly over the cylinder head assemblies. A novel method of securing roughened surfaces on the deck-plate passages around the engine housings has been employed. Each of the small projections rising above the deck-plate is a globule of metal deposited by electric-arc welding and rough finished with a portable grinding wheel. This method of providing sure footing on the deck-plates has the advantage of being readily renewed when worn, without the necessity of renewing entire sections of the deck-plate.

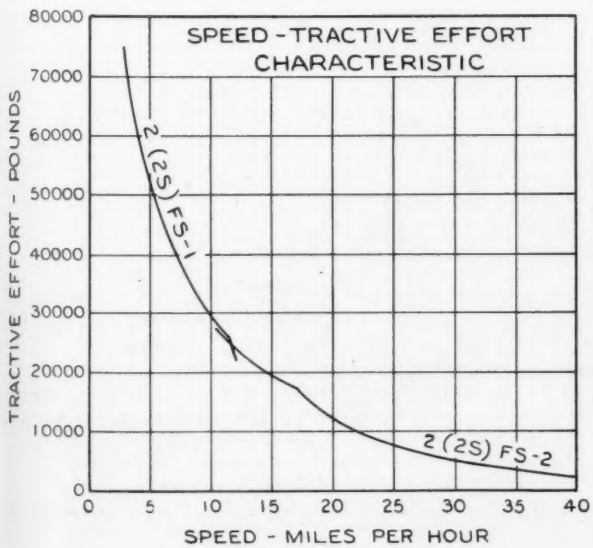


Fig. 3—Speed-tractive effort curves

Service

Both locomotives are assigned to heavy-duty switching operations in the River Rouge plant of the Ford Motor Company, and are performing the same character of service formerly handled by steam locomotives of somewhat greater horsepower rating.

The maximum speed-tractive effort characteristics obtainable from the equipment are shown in Fig. 3. It will be noted that full engine output utilisation may be obtained at speeds up to 17 m.p.h., at which speed the horsepower output of the locomotive falls off at a rate determined by the shape of the generator volt-ampere characteristic in the light load section of this curve. Such a speed-tractive effort characteristic has been found by experience to be well suited to ordinary switching requirements, since switching speeds with full locomotive power output are seldom greater than the speed at which full power utilisation is obtained in the characteristic of Fig. 3. The continuous tractive effort rating is 29,000 lb. at 10 m.p.h., corresponding to an adhesion of 11 per cent. The maximum tractive effort, which can be maintained up to 3 m.p.h., is about 75,000 lb., corresponding to an adhesion factor of 3·5. The permissible maximum speed of operation as limited by traction motor armature safe peripheral speed is 40 m.p.h.

Power Plant

The prime movers in each of these locomotives are two 500-b.h.p., four-stroke, six-cylinder, airless-injection diesel engines manufactured by the Cooper-Bessemer Corporation. The cylinders are $10\frac{1}{2}$ in. in diameter by $13\frac{1}{2}$ in.

stroke, and the output is limited to 500 b.h.p. at 675 r.p.m., under which conditions the m.e.p. is 84 lb. per sq. in. and the piston speed 1,515 ft. per min. Complete with the structural steel all-welded bedplate which carries the generator also, the engine weight is 21,500 lb., equivalent to 43 lb. per b.h.p.

The base and centre-frame assembly is a one-piece semi-steel casting with integral trussed cross-sections to carry each of the main bearings in a well-ribbed, semi-steel casting separate from the base and centre-frame casting. Removable cylinder liners with top and bottom joints sealed water-tight by round rubber grommets in turned recesses are held in the cylinder blocks by individually cast water-cooled cylinder heads. The base, centre-frame, cylinder block, and cylinder heads are held together by four alloy-steel through bolts for each cylinder, extending from the truss sections beneath each main bearing to the tops of the cylinder heads. This construction, eliminating all tension stresses from the main castings, permits the use of lighter castings, and thus contributes effectively to maintaining the specific weight at a low figure. The main bearings are babbitted and are $7\frac{1}{2}$ in. diameter by $3\frac{7}{8}$ in. long with an oversize bearing $5\frac{7}{8}$ in. long at the generator end.

An interesting feature in connection with the wristpin design is the method of connection of the pin to the connecting rod. The hollow-bored pin is held in the saddle-shaped top of the connecting rod by two alloy-steel bolts, and this arrangement permits the top of the wrist pin for its entire length to be used for bearing surface, thus contributing to long lived performance and quiet operation. Pistons are of light-weight aluminium alloy with crown shape designed to assist turbulence and clean combustion, and they carry four pressure and two scraper rings.

A hollow-bored camshaft is carried in bronze-bushed bearings on the side near the top of the cylinder block. Inlet and exhaust valves, carried in the cylinder head castings, are operated by forged rocker arms and short push rods, the lower ends of which rest against hardened cup blocks carried in guides with hardened rollers.

The engine is of the dry-sump type, lubricating oil being collected in an oil trough cast in the case for the full length of the base, from which trough the oil is pumped to an outside sump tank. All main bearings, connecting-rod bearings, wrist pins, and camshaft bearings are pressure-lubricated by a built-in pressure pump. The fuel system consists of a duplex oil pressure pump, an adjustable pressure regulating valve and an atmospheric relief timing valve for each block of three cylinders. The timing valves relieve the fuel pressure to the atmosphere in the line to each nozzle after each injection, thus eliminating dribble at the nozzle and ensuring clean combustion. A gear-driven cooling-water circulating pump is mounted on the manifold side of the engine.

Each engine is provided with its own cooling water system, wherein the cooling water is forced through a radiator assembly located behind the grille-work at the end of each engine-housing, by the water-pump mounted on the engine. Cooling air is drawn through the grille-work and radiators and discharged upwards by a four-bladed propeller-type fan, 36 in. in diameter. These fans are of the Aphonic type, with low-noise, high-efficiency characteristics, each designed to handle approximately 25,000 cu. ft. of air per min. Thermostatically-operated radiator shutters are provided to regulate the quantity of air-flow, particularly under low temperature weather conditions. Thermostatic control of the fan motors is also provided for close regulation of cooling water temperatures. Each radiator assembly includes a section for engine lubricating oil cooling purposes.

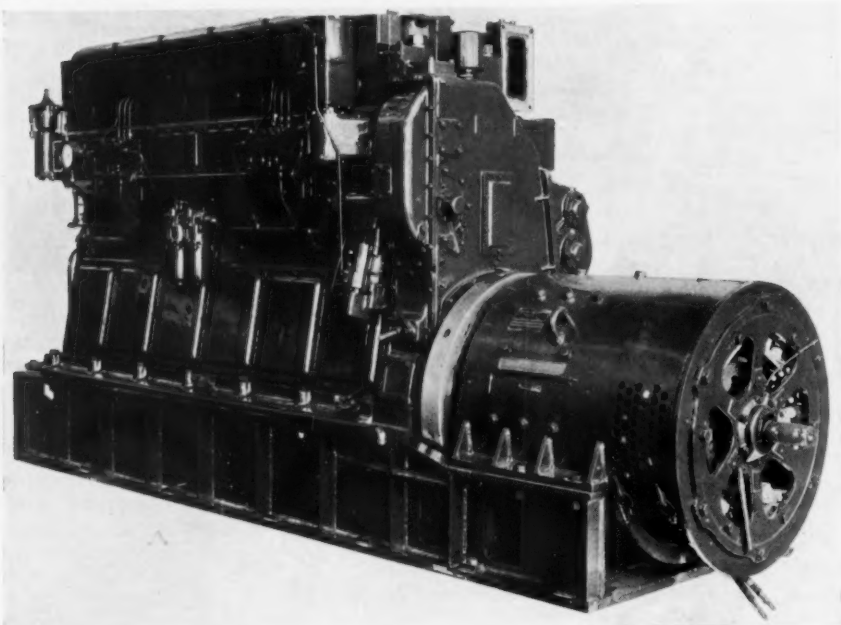
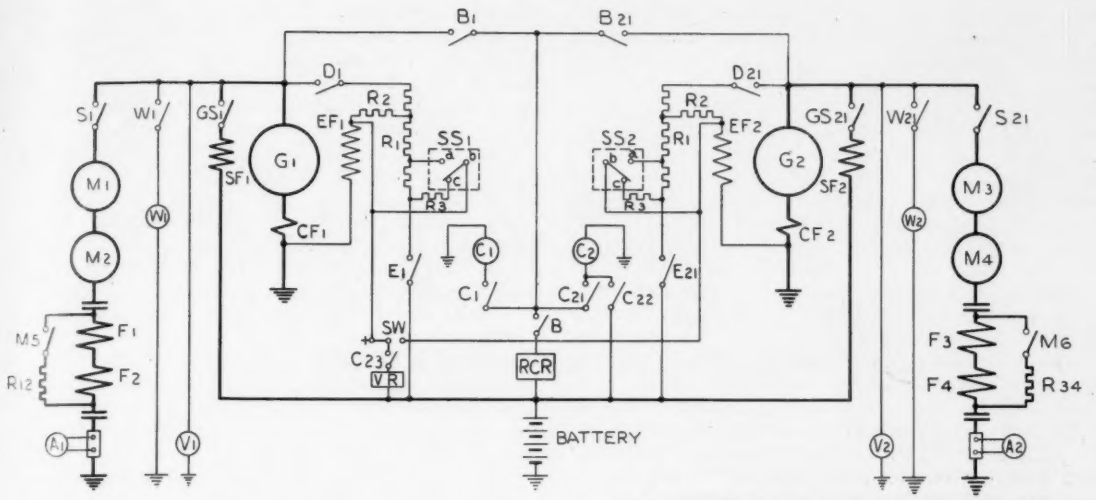


Fig. 4—500-b.h.p. Cooper-Bessemer engine and General Electric 380-kW. d.c. generator mounted on common welded steel underbed

Electrical Equipment

Directly connected to each of the engines is a 380-kW. direct-current self-excited shunt-wound railway-type generator. Their characteristics are such that, in conjunction with the load-regulating device provided, the engines cannot be overloaded, but can be loaded over a wide range to the full rating of the engines. The generator armatures are connected solidly to the engine flywheels without the interposition of flexible or other types of couplings. Each generator includes a single anti-friction bearing at the commutator end for the armature, the back end of the armature being supported by the engine flywheel bearing. Fabricated construction has been employed ex-



G1, G2	GENERATORS
M1, M2, M3, M4	TRACTION MOTOR ARM
F1, F2, F3, F4	TRACTION MOTOR FIELDS
W1, W2	RADIATOR FAN MOTORS
C1, C2	COMPRESSOR MOTORS
RCR	REVERSE CURRENT RELAY
VR	VOLTAGE REGULATOR
SW	TRANSFER SWITCH FOR VR
SF1, SF2	GENERATOR STARTING FIELDS
EF1, EF2	GENERATOR EXCITING FIELDS
CF1, CF2	GENERATOR COMMUTATING FIELDS
A1, A2	AMMETERS
V1, V2	VOLTMETERS
R12, R34	TRACTION MOTOR FIELD SHUNTING RESISTORS
SS1, SS2	SPEED SWITCHES
R1, R2, R3	CONTROL RESISTORS

SEQUENCE OF CONTACTOR CLOSING

STEPS	CONTACTORS	S1	S21	M5	M6	GS1	GS2	D1	D21	E1	E21	B	B1	B21	C1	C21	C22	C23
START ENGINE NO.1						•												
START ENGINE NO.2							•											
IDLING WITH GEN. NO.1 CHARGING BATTERY													•	•				•
IDLING WITH GEN. NO.2 CHARGING BATTERY													•		•			•
TWO MOTORS OPERATING IN SERIES FROM EACH GENERATOR	FS-1	•	•					•	•	•	•							
	FS-2	•	•	•	•			•	•	•	•							
COMPRESSORS WORKING ON GENERATOR NO.1													•		•	•		
COMPRESSORS WORKING ON GENERATOR NO.2														•	•	•		
COMPRESSOR C_2 WORKING ON BATTERY																	•	

Fig. 5—Wiring diagram of General Electric transmission and system of control as used on the 1,000-b.h.p. double-engined four-motor diesel-electric shunting locomotives

tensively throughout the generator, the bearing housing and the brush-holder bodies being the only castings employed.

Four GE-726-A-1 300-volt d.c. series-type traction motors of conventional design in box-frames, arranged to operate two and two in series, are axle-mounted with nose suspensions in spring-borne cradles. They have a continuous rating of 220 h.p. each and drive the axles through 68 : 15 spur gears. Armature bearings are of the anti-friction type, grease-lubricated, and the axle-bearings are of the waste-packed oil-lubricated type with constant oil level reservoirs. Multiple ventilation (air passages in parallel through armature core and around the exciting fields) is furnished through openings in the motor frames adjacent to the truck transom.

All of the auxiliaries, with the exception of the traction motor blower fans, are electrically driven by individual electric motors taking power from the traction generators. The traction motor blowers, driven by vee-belts and sheaves from an extension on the engine crankshafts, are located in the radiator fan compartments and each furnishes ventilating air to two traction motors. A total of 2,200 cu. ft. of air per min. is furnished by each fan with the engine running at top speed. Air from the fans is led through short ducts to the hollow centre-plate over each truck and distributed to each of the traction motors through openings in the hollow truck transoms.

System of Control

Each generator is provided with but one exciting field winding—a simple shunt winding—connected in the control circuits as shown in the elementary diagram Fig. 5. These connections are such that as the engine-generator set is brought from idling speed to running speeds the field on each generator is initially separately excited from the battery, and eventually is self-excited from the generator. In this way the disadvantageous features of instability at heavy loads and the possible failure to build up, both characteristic of the ordinary self-excited shunt machine, are eliminated. Except for this initial period of battery excitation, and when carrying full load at full speed, the generators are shunt-wound generators with excitation so proportioned that the generator torque falls off faster than does the engine torque with the same drop in speed, thus avoiding engine stalling. The general characteristic at rated engine speed is made to conform to the engine constant horsepower characteristic by means of a speed-switch, the essential elements of which are shown in Fig. 6.

The speed switch is designed so that it is not involved in the regulating scheme until engine speeds approaching the rated speed of the engine are reached. The electrical elements of the switch are located in the control circuits as shown in the simplified diagram Fig. 5, and are lettered to correspond to the contacts shown in Fig. 6. In the simplified diagram of electrical connections shown above, the two speed switches, one for each power-transmission group, are designated *SS1* and *SS2*.

On the shaft *S*, which is driven by the engine, is mounted the weight *W*, which is free to turn about the shaft but for the constraint imposed by the spring *X* (one end of which is fixed to the shaft projection *P*) which tends to keep the contacts *b* and *c* closed. The contacts *a* and *c*, with their associated collector rings, properly

insulated, turn with the shaft. As full speed of the engine is approached, the centrifugal action of the weight *W* operates to separate the contacts *b* and *c* and to bring together the contacts *a* and *b*. When the weight is in the top half of its rotation (as shown in the sketch) gravitational pull assists the spring in trying to open the contacts *a* and *b* against the centrifugal action in attaining or retaining closure of the contacts *a* and *b*. When the contacts *a* and *b* are closed the resistances R_1 and R_2 are paralleled, thus increasing the field current to that which corresponds to the generator load curve *RSH* in Fig. 7 at full speed of the engine. If the ampere load demand on the generator is greater than that corresponding to the point *S* in Fig. 7, the power demand of the generator is greater than the engine rating. The generator attempts to work along the characteristic *RSH*, overloading the engine and momentarily reducing its speed. As the speed falls the contacts *a* and *b* are separated and the power demand on the engine is reduced to that represented by the curve *VTO*, and the engine speed increases. The fact that the contacts, whether in the *a-b* or *b-c* positions, are continually opening and closing while the engine is running at speeds just below and approaching the full rated speed, under the influence of gravity (with rotation of the shaft) and under the combined inertia of the weight and periodic impulses imparted by the power strokes of the engine, prevents the system from hunting. At the same time, average values of excitation of the generator, the intensity of which depends upon the rate of opening and closing of the contacts *a* and *b*, are obtained so as to permit of close utilisation of the engine rating without excessive speed regulation. The maximum power characteristic obtained will correspond to the curve *RSTU* in Fig. 7.

Actually, the speed switch employed in the Ford locomotive control scheme consists of four sets of contacts connected in parallel, to obtain the requisite current carrying capacity. All four sets are carried in a single rotor, mounted on top of the generator frame and driven by vee-belts from an extension of the generator armature shaft.

Control Connections

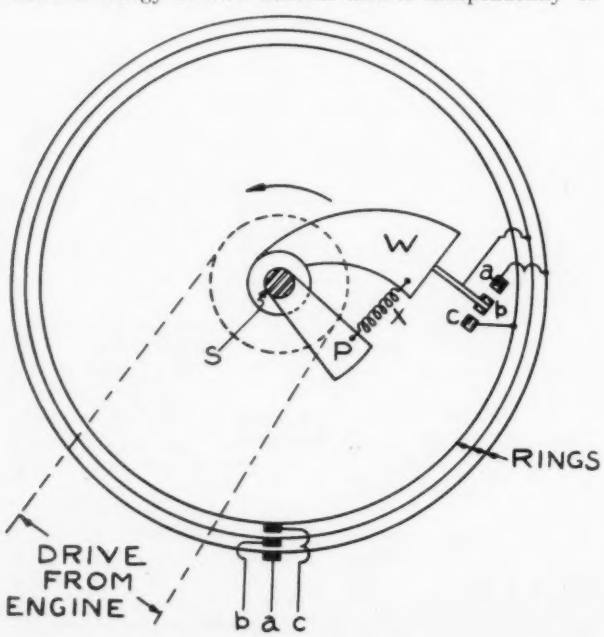
The generators are not paralleled, and each unit supplies traction energy to two traction motors independently of the other generator. The traction motors are connected two and two permanently in series and provision is made for full-field and one step of reduced field strength operation of the motors. The transfer from the full field to the reduced field connection is effected automatically under the control of a relay operating on generator voltage. The transfer is arranged to occur at the point which will result in the best utilisation of the capacity of the engines.

Two-station control—one station on each side of the operating cab—is provided. Engine starting is effected by utilising the generator as a starting motor supplied from the 48-cell, 171-amp.hr. lead-acid storage battery. A special starting winding, connected in series with the generator armature during the cranking period only, is furnished on each generator. Heavy current circuits are handled by electro-pneumatically operated contactors and traction-motor reversers, and circuits carrying moderate loads are controlled by electro-magnetic contactors or snap switches.

Each operating position is provided with a chromium-plated instrument panel carrying a cooling water temperature indicator; a lubricating oil pressure gauge and a fuel-oil pressure gauge for each engine; traction motor ammeters; a battery-charging ammeter; a generator voltmeter; air-brake system gauges; and the necessary snap switches for auxiliary and lighting control. All control apparatus is mounted in wall cabinets located in the operating cab, and in the space directly under the operating cab floor. Access to this space is provided through trap doors in the cab floor and through hinged doors in the sides of the cab below the floor-line. Control valves, equalising reservoirs, and triple valves employed in connection with the air-brake control apparatus, as well as the air strainers for the air compressors, are also located in the compartment below the operating cab.

Air Compressors

Compressed air for the braking and control systems is furnished by two motor-driven two-stage compressors



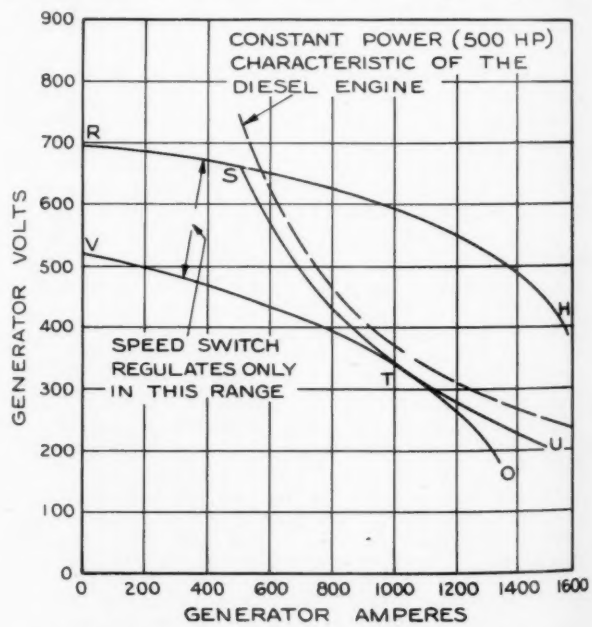


Fig. 7 (above) : Electric transmission characteristics
Fig. 6 (left) : Schematic diagram of General Electric speed switch fitted to Ford switching locomotives

each with a piston displacement of 55 cu. ft. per min. against 135 lb. per sq. in. pressure. The motors are designed for operation on 115 volts and the compressors operate on generator power only when the engines are idling. Power is taken from one of the two traction generators, the voltage of which is under the regulation of a voltage control relay operating only when the engine is at idling speed. Selection of either generator as the power source for the compressors is accomplished by a manually operated knife switch controlling the contactors *B1* and *B2f* (see Fig. 5). One compressor is arranged for operation from the storage battery, under the control of a separate pressure governor, when the engines are running at speeds other than the idling speed. Inasmuch as a large percentage of the total time in switching service is consumed with the engines idling, ordinarily no difficulty is experienced in maintaining air reservoir pressures with the compressors operating only while the engines idle. Operation of one compressor from the battery while the engines are delivering power for traction is at the option of the operator and under his control through a snap-switch located in the operating compartment.

THE CONTROL OF DIESEL RAILCARS

*By Major W. G. WILSON, C.M.G.**

A GLANCE at the control desks of the different types of railcar will show where the similarities lie. All aim at the minimum of levers, gauges, buttons, and the like to distract the driver's attention. All have throttle, brake, and forward and reverse controls, oil pressure gauge, air pressure gauge, and either a speedometer or revolution counter or both. A gear-changing mechanism with or without clutch control is also necessary with mechanical transmissions, and a direct-drive control with hydraulic transmission.

Electric Transmission

There are a number of electrical control systems which keep the output of the engine constant at a certain controller position. In some of these systems the main generator exciting windings are arranged so that, as the voltage changes, the current is varied to keep the generator load constant. Other systems regulate the generator voltage by means of the engine governor, in such a way that the output per working cylinder is maintained constant. In this type of control fluctuations in load on the auxiliaries are compensated, so that the engine load always remains the same.

The control gear can also be designed in such a way that the maximum possible tractive effort, and consequently also the maximum possible current in the generator and traction motors, can be limited. Against these unquestionable advantages must be offset the relatively low efficiency of this type of drive, and in weight, cost, and complication it also compares favourably with its rivals. Nevertheless it still provides the only known means of distributing the power from one large engine over a large number of axles situated in different parts of the train.

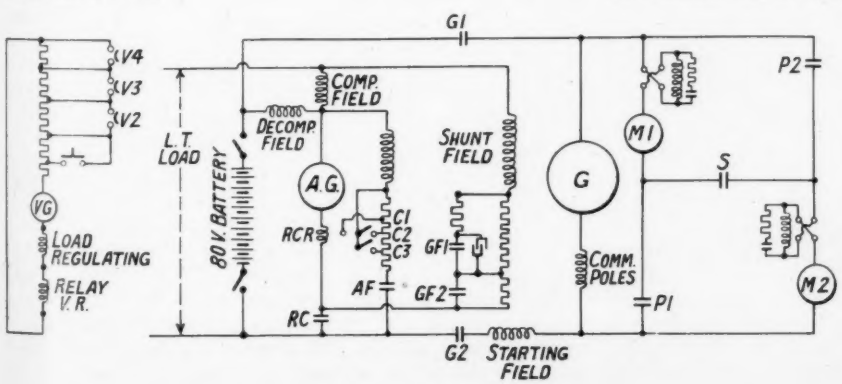
* In a paper read before the Institution of Mechanical Engineers, November 18, 1938.

[Major Wilson next described the Brown Boveri-Sulzer system of electric control—the servo-field regulator method—which was described very fully in the issue of this Supplement for June 10, 1938.—ED.].

The English Electric torque control system has been developed to meet the conditions that at any given engine speed there is one load at which the engine efficiency is at its maximum, and that after a long period of service (*e.g.*, 5,000 running hours), the engine will no longer develop its full output. The electrical loading therefore should regulate the load automatically to suit the engine condition. Another point is that under light loads the engine will develop the required power at speeds considerably below its maximum, and therefore it is economical to have a range of engine speeds and to utilise within suitable limits the minimum speed necessary.

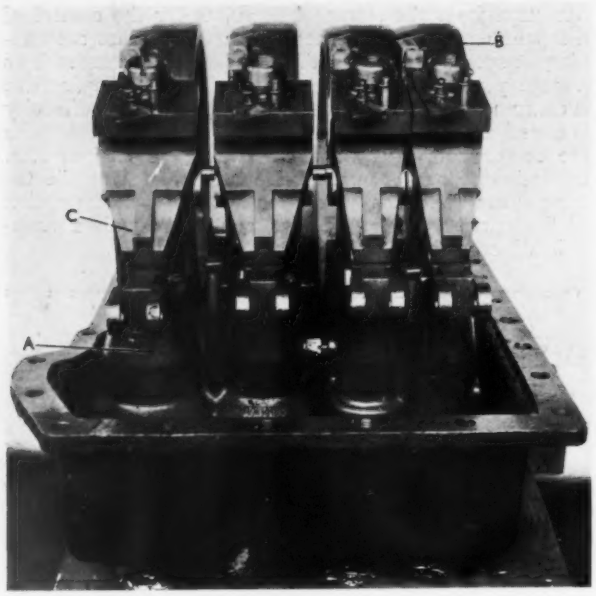
The master controller handle has a number of positions, the first group representing different engine speeds and outputs, and later positions traction motor grouping and field weakening. For each engine speed position the operations simultaneously performed are: (1) The fuel opening is set to a predetermined value; (2) the torque control loading governor is set for this speed and load; (3) the engine mechanical governor is set for this speed.

The torque control governor actually maintains the engine speed and load within the required limits and the engine governor is only a safeguard. In operation, the single master controller handle is moved from one position to another to regulate the speed of the vehicle. The engine speed is controlled automatically and the loading of the engine is automatically regulated to match the torque which the engine is capable of giving. The grouping and field weakening of the motor provide additional running notches, but in each notch, the torque control mechanism functions in exactly the same manner as for the different engine speed positions.



G	Main generator
AG	Auxiliary generator
VG	Voltage generator
M1, M2	Traction motors
GF1, GF2	Field regulating contactors
V2, V3, V4	Contactors for resistance adjustment
C1, C2, C3	Regulating resistances
G1, G2	Starting contactors
AF	Exciter field contactor
S	Series contactors
P1, P2	Parallel contactors
RC	Battery cut-out contactor
RCR	Battery cut-out relay

Diagram of main circuits of English Electric control



Gear-changing air cylinders, Wilson gearbox; A, air cylinders; B, brakes; C, levers and toggles

The torque control mechanism, which controls the engine speed, consists of a small voltage generator, direct driven from the engine, a load-regulating relay, and a generator field-regulating contactor. The potential generated by the voltage generator is directly proportional to the engine speed. The load-regulating relay is fitted with a single pair of contacts which open and close under the influence of small changes in the current in its operating coil, and the latter is connected in series with an adjustable resistance across the terminals of the voltage generator. The relay is set so that when the engine is revolving at the correct speed, the contacts are on the point of making or breaking contact, and any departure from this speed is followed by a decided movement of the relay armature, closing the contacts on increase and opening them on decrease.

Mechanical Transmissions

In the epicyclic gear of the Wilson type, band brakes are provided which can be adjusted to yield when excessive loads are placed upon them, as, for instance, when the inertia of the engine is being absorbed too rapidly and is tending to jerk the car forward. The bands are arranged to unwrap in the direction of the overrun, so that if the car tends to drive the engine, slip takes place more readily than when the engine drives the car. Inequalities of speed are in this way damped out. The synchronising clutches in the Mylius, the plate clutches of Ganz, the oil-operated clutch of the S.L.M., and the magnets of the Cotal, yield in the same way to an inequality of drive.

In the normal way the Wilson gearbox is preselective, and by the rotation of a camshaft, which is connected to the control lever, the driver can set the mechanism in such a way that when the gear-engaging lever, or busbar, is operated, the selected gear will be picked up and engaged. The remote control of the Wilson gearbox has been developed from this preselective mechanical type. The first method of adapting remote control to the gear selection, evolved by Mr. Wakley of the Drewry Car Co. Ltd., was to connect the camshaft to an air-operated piston moving in a double-ended cylinder in such a way that admitting air to either end of the cylinder pushed the piston to a position corresponding either to a higher or lower gear. The movement of the piston in the cylinder was controlled by solenoid-operated pegs which butted into the cylinder and limited the travel of the piston to make it stop at a position which corresponded to the desired gear. The gear was selected by first operating the pegs by a selector switch, after which air was simultaneously admitted to that end of the cylinder desired, and to the cylinder which controlled the busbar.

An alternative method makes use of small air cylinders, one per gear, to take the place of the camshaft, and to cause the gear-operating struts to engage with the busbar; air is admitted to the cylinders by electro-pneumatic valves. This system is standardised on the fleet of 100 Drewry railcars on the Buenos Ayres Great Southern and Buenos Ayres Western Railways; any three of these cars can be coupled together in any order and driven from either end. This single-lever control has been patented by Mr. Wakley. Movement of the gear-changing lever in one plane acts as a gear selector control and in the other plane (*i.e.*, into the notches which open off the quadrant) as a gear-engaging and freeing control. In this way a preselective action is retained, but a single lever suffices. One lever is the key to both the gear-changing and the forward and reversing control. It is removable from the quadrant only in the neutral position, so that under no conditions can it be taken out when the gear is engaged. The knob is a lock and when it is put into the forward and reverse control socket no accidental movement can take place.

Other features include the provision of revolution indicators and oil pressure indicators for three cars, fitted to every driving cab, so that coupling up the control circuits automatically couples up the revolution counters. In this way the driver has a direct knowledge of the speed of revolution of all the engines and their oil pressures, and therefore knows at once if anything has gone wrong with engines or transmissions in the trailing cars.

A different arrangement, developed by the London Passenger Transport Board, is to use solenoids pushing against struts. This arrangement is also satisfactory, especially as it is intended to operate in conjunction with a scheme by which the solenoids are only energised when gear changing is in process, a special switch being designed for the purpose. Where compressed air is not available this system can be operated by means of a vacuum. This system is employed on the articulated twin-engined railcars built for the Buenos Ayres Midland Railway.

For the larger types of railcar and when compressed air is available, the busbar is dispensed with altogether, and independent air cylinders are arranged for each gear brake band, the air being admitted to each cylinder either by an air distributor valve, or an electromagnetic valve. This type of gearbox is shown in a partly assembled condition on this page. The cylinders A in the foreground operate the brakes B which surround the gears (not shown) by means of levers and toggles C. Air pressure is kept constantly on the cylinder of that gear which is engaged.

In order to prevent overdriving the engine by changing to a lower gear at an excessive car speed, an overspeed governor has been evolved. This consists of a governor mechanism driven off the input shaft of the gearbox, and arranged so that if a predetermined speed is exceeded, a switch is tripped and the air supply cut off, thus engaging neutral gear. Another safeguard which has been adopted with great success has been to connect the gear-changing valve to the throttle lever, thus dispensing with one lever or pedal, and ensuring that changes of gear only take place with the throttle closed.

The Mylius gearbox is a constant-mesh spur gear drive pneumatically operated. The gear control is preselective, and electro-pneumatic valves are used for both preselection and gear engagement. A main air cylinder operates both the main engine clutch of the open multiplate type and the gear engagement. When air is admitted to this cylinder, the clutch is first disengaged, owing to the fact that its springs are lighter than those which engage the gear, and the gears then are freed. With the air pressure increasing, the synchronising cones of the next desired gear are engaged; these cause the speeds of the dogs of the gears to be corrected so that when the air is released from the cylinder the dogs will come together without clashing. It follows that the main clutch will engage after the dogs have done so. A system of indicator lights shows the driver if any of the gearboxes have failed to engage properly or if preselection is not fully accomplished on any of the boxes before the actual change of gear is attempted. [The latest Mylius box was fully described in the issue of this Supplement for July 9, 1937. —ED.].

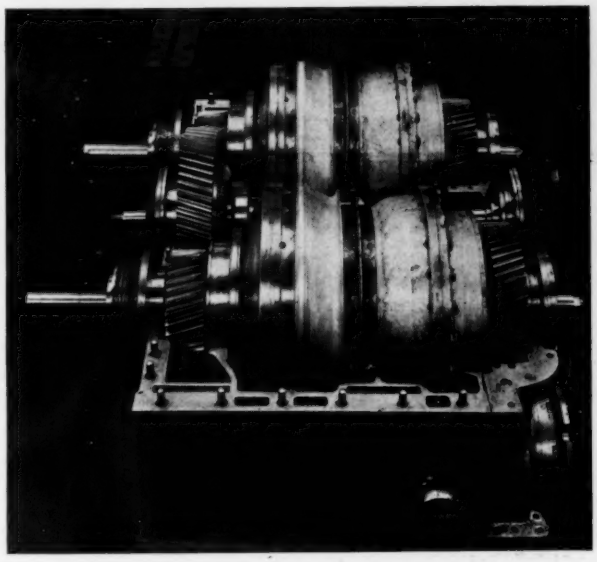
The Ganz mechanical system is a constant-mesh, all-gear transmission, employing plate clutches and operated by compressed air. With the change-speed gear set at neutral, no air can be applied to any of the gear-operating cylinders. When the gear lever is moved to the first position, air is admitted to the cylinder which disconnects the dry friction clutch attached to the engine. The next step is to admit air to the gear-engaging cylinder of the first gear. Starting the car is then carried out by relieving the pressure in the clutch cylinder, allowing it to take up the drive. Air pressure is kept on the cylinder of the first gear so long as that gear is required. Restriction of exhaust from the clutch-operating cylinder ensures a smooth start and prevents sudden engagement. Once the car has started the drive is kept on first gear until the moment second gear is required. The change from first to second gear is effected by moving the gear lever from one notch to the next, which exhausts air from the first-speed cylinder and admits it to the second-speed. The main engine clutch is not employed when changing gear but only for starting. The arrangement is such that it is impossible for two gears to be engaged simultaneously, as the valves have an overlap and provide a neutral speed between the gears.

The Ganz electro-pneumatic remote control, in addition to enabling the cars to be controlled from a distance, has been developed further by the provision of a controller which, in the neutral position between gears, automatically reduces the admission of fuel to the engine in order to synchronise the engine speed when changing to a higher gear. Thus the driver need not handle the throttle lever when changing gear. In the case of multiple-unit trains electro-pneumatic valves are employed to admit air to the gear-engaging cylinders. This eliminates any necessity for relay valves, which are sometimes used if long pipes are necessary between controls and engine.

Fluid Couplings

The Vulcan-Sinclair fluid coupling can be regarded from the point of view of control as an automatic means of disconnecting the drive and preventing stalling of the engine, as well as of providing a smooth start by operation of the governor control only. In its normal form it is not adapted to work as a clutch which can be disconnected at will to assist changes of gear ratio, and mechanically one of its chief virtues lies in its ability to damp out vibrations, and to act as a cushion between the power unit and the driving wheels.

Its function of ensuring a smooth start without skill on the part of the driver, and of giving a constant torque to the wheels during the starting period, is very valuable. The success of the fluid coupling for railcar purposes can be largely attributed to the epicyclic type of gearbox, because when associated with it full advantage can be taken of these properties without demanding from it in addition the function of a freeing clutch. No controls are required for the fluid coupling, except when used with gears that require mechanical meshing of teeth, when additions in the form of a rocking brake have to be provided.



400-b.h.p. Voith double turbo hydraulic drive

Partial-Hydraulic Systems

Variable-torque hydraulic transmissions have the advantage that they allow the engine to work at its most economical speed at all times, but against this must be offset their high loss in efficiency except in direct drive and over a limited torque ratio when driving through the torque converter. They are, however, simple to control and in this respect can be compared with a two-speed gearbox, the only change necessary being that between converter and direct drive. They are smooth and quiet in operation and have few wearing parts, but attention has to be given to glands and oil connections, as in most cases a radiator has to be provided which is detached from the transmission.

The hydraulic torque converters which have so far achieved most success are of the turbine as opposed to the displacement type. Two types which may be taken as examples are the Lysholm-Smith [Leyland and V.S.G.] and the Voith-Sinclair. Both consist of the two drives, torque conversion and direct, but their main difference lies in the direct drive which in the case of the Lysholm-Smith is by means of friction clutch, and in the Voith-Sinclair by means of a fluid coupling. Both types, when driving through the torque converter, give a constant engine speed for a given throttle opening and car speed, and both give a smooth start from rest without the necessity for operating a clutch.

Losses in the torque converter, especially in conditions when a large torque increase is required, somewhat limit the applications, but the advantages offered by transmission of this type from the point of view of control are very great, as it is almost impossible to abuse them except by bad handling of the controls under direct drive, and skill in operation is reduced to a minimum.

XUM

WORM DRIVES FOR RAILCARS AND LOCOMOTIVES

A brief study of various designs

By C. W. McARD

Fig. 1—A group of Holroyd worm drives for diesel locomotives

THE worm drives which have been successfully used as final drives for diesel vehicles include a worm shaft, made of casehardened nickel steel and with the worm carefully ground after hardening, and a wheel which is of special-grade bronze centrifugally cast, and with the teeth cut by a special hobbing machine. The design of the gearbox itself is such that, when necessary, the worm shaft can be easily and fairly quickly removed and replaced by a new unit. Not so the worm wheel, however, and unfortunately it is the wheel which is the first to wear out, and normally will be replaced several times for each occasion when it is essential to provide a new worm shaft.

In many early examples, and even in some recent units, the wheel is pressed on to the appropriate part of the axle with a pair of sunk keys for taking the drive. This is satisfactory providing the wheel is turned up by using the axle as a mandrel, and the teeth subsequently cut thereon. But replace wheels become a problem, not only in respect of their accuracy, as it is obviously not possible to adopt the practice of turning and cutting the replace wheels on their own axles after the latter go into service, but also in the actual fitting on the axle, and in most examples of this construction one of the road wheels must be removed before the new worm wheel can be fitted.

Although this may be a feasible proposition, it is open to objections, and to overcome these the method shown in Fig. 2 has been used. In this case two flanged carriers meet on a splined portion of the axle, which serves both

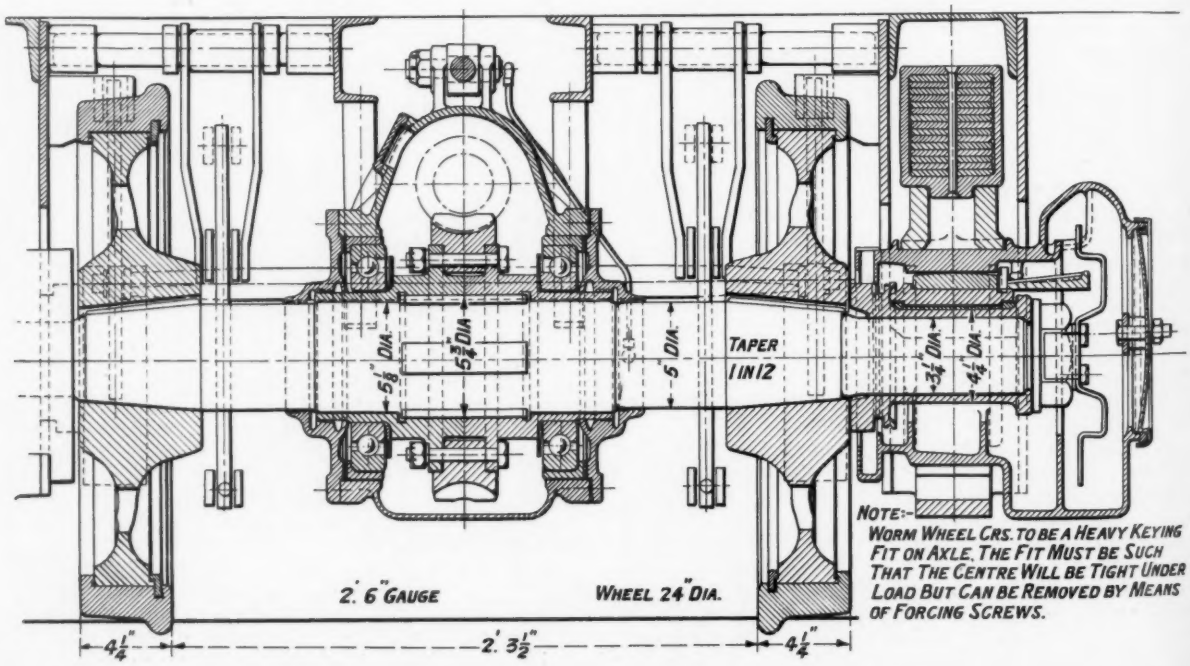

5⅛" DIA.
5¾" DIA.
5" DIA.
TAPER 1 IN 12
3¼" DIA.
4¼" DIA.
NOTE:- WORM WHEEL CRS. TO BE A HEAVY KEYING FIT ON AXLE. THE FIT MUST BE SUCH THAT THE CENTRE WILL BE TIGHT UNDER LOAD BUT CAN BE REMOVED BY MEANS OF FORCING SCREWS.
2' 6" GAUGE
WHEEL 24" DIA.
4¼"
2' 3½"
4¼"

Fig. 2—Arrangement of worm drive for 2-ft. 6-in. gauge diesel railcar

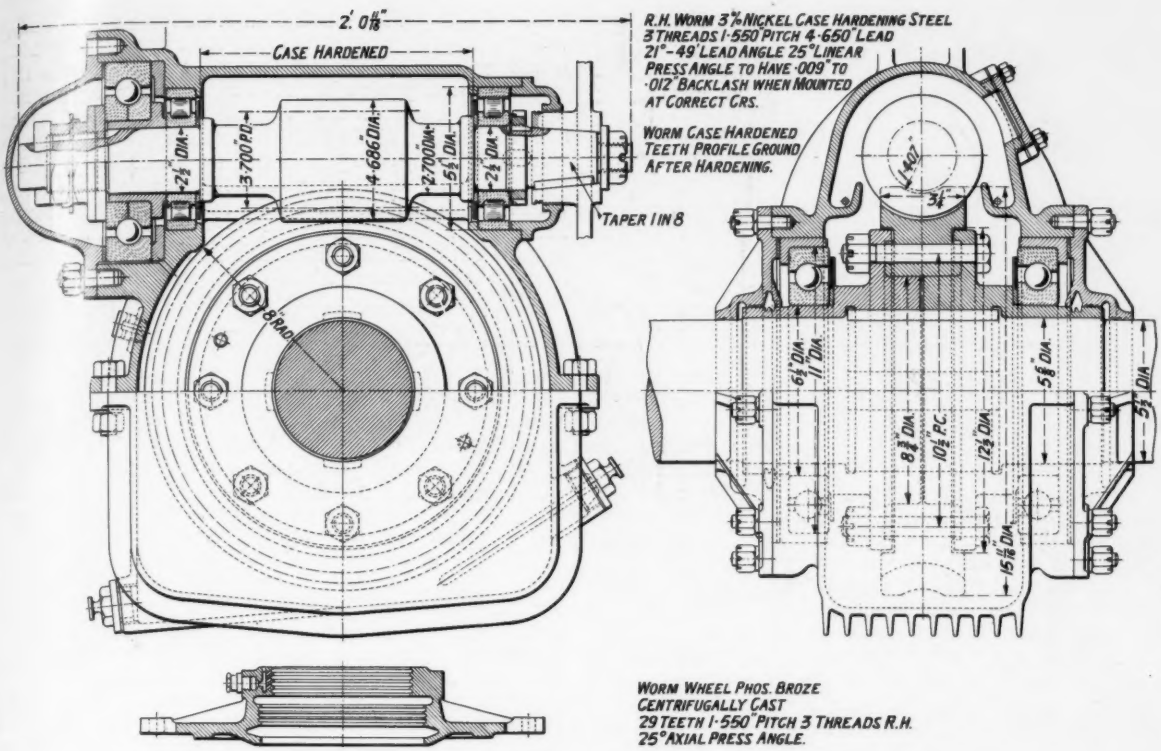


Fig. 3—Worm drive with divided wheel mounted on spline with carrier plates having lips on the outer periphery

to transmit the drive and also locate transversely the gear unit on the axle. Between these carriers the worm wheel, or rim, is mounted and secured to form a rigid drive by turned and driven bolts with nuts adequately locked. The road wheels in this design are removable, being mounted on tapered axle seats, as indicated in Fig. 2. Although to some engineers this scheme may not appeal on account of the tapered wheel seats, it has proved in service as reliable as the normal practice of parallel seats, and notwithstanding the fact that these units were built for the 2 ft. 6 in. gauge, their mileage is now approaching the million mark and no defect has been reported. A feature which may commend itself is the absence of wearing surfaces on the axles, apart from the oil seals for the gearbox, as the main axle bearings are provided with loose renewable sleeves whose chief function otherwise is to transmit the pressure from the end nuts securing the wheels on their tapered seats.

The scheme just referred to has proved a stepping stone to the most modern method, as shown in Fig. 3. Carrier plates, fitting on a splined portion of the axle in exactly the same manner as those shown in Fig. 2 are used. The main feature is the introduction of lips on the outer periphery of the carrier flanges whereby these grip the recessed surfaces of the worm wheel rim and provide a very sound fastening. When replace rims are to be fitted it is necessary merely to dismantle the box (as previously), remove the rim bolts, and withdraw the carriers endwise along the axle. The worn-out rim is then cut off, a new rim in halves placed in position, holes reamered through, and the whole bolted solidly together without the road wheels being disturbed. This scheme has long since passed the experimental stage, and has now been adopted as standard practice for many units, giving full satisfaction to users on many systems and under extremely varying conditions of service.

A point which is sometimes overlooked is the security of the fastenings of the worm shaft itself. As may be noted from Fig. 3, a thrust bearing is mounted outside the carrying race at one end, and when running in one direction the end load transmitted from the worm passes through the thrust race to the box itself *via* the end cover. In the other direction of running, the end load comes on the outer nut and unless the thread is correctly designed —right or left hand—there is grave risk of the nut becoming unscrewed and serious consequences occurring to the box as a whole. The risk is obviated by making the screw for the locking nut opposite in hand to the worm itself; for a right-hand worm a lock nut having a left-hand screw should be employed (as in Fig. 3) and *vice versa*.

The mileage obtainable from worm wheels which are suitably proportioned for the loads to be carried depends on a number of factors, but given normally favourable conditions this may be anywhere between 150,000 and 200,000 miles. The oil used is a very important factor; so is the provision of ample ribbed surfaces on the box to catch the main air stream and cool the oil. An oil which the writer found to give exceptionally good results was one having a castor base, and where mineral oils of first-class quality, giving valuable service under less onerous conditions, had failed to keep a cool box, that referred to invariably overcame any tendency to excessive heat. The maximum temperature up to which it was found safe to work the oil was from 190° to 200° F.

One of the constituents in the final drives on the axles is the torque arm, which links the gearbox unit to the bogie or underframe structure in such a manner as to restrict the rotary movement of the gearbox while per-

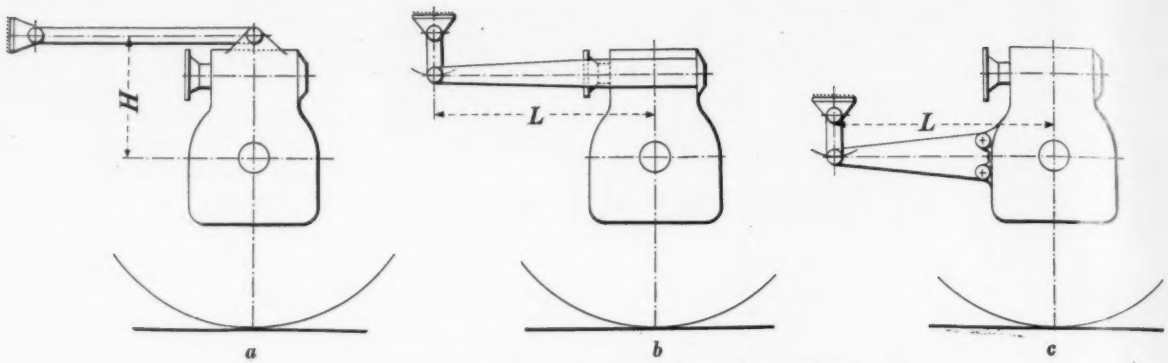


Fig. 4—Diagrammatic representation of different forms of torque arms

mitting the free rise and fall of the axle carrying the drive. This rotary movement should be eliminated as far as possible, but the designer may find his hand tied to a very considerable extent by the vehicle design. In Fig. 4 are shown some of the usual types, of which (*a*) is the most frequently used. By this arrangement is obtained the minimum variation in the angular displacement of the worm shaft due to the rise and fall of the axle, and therefore the least shock loading of the teeth in the driving unit. When wear takes place in the axlebox faces or those of the guides, the clearance created should be taken up immediately, as otherwise it results in a hammering effect which is transmitted to the superstructure and not only interferes with the comfortable riding of the coach but also reduces the life of the vehicle. For this reason guides with adjustable wedges are recommended for this type of axle drive, although in present practice they are not always used.

In Figs. 4*a* and 4*b*, as the force set up by the load in the torque arm is applied vertically to the superstructure or the bogie frame, this is absorbed to a very large extent by the springs and is not therefore felt to the same extent as in the arrangement shown in Fig. 4*a*, the effect of which is mainly a variation of spring and rail loads. Furthermore, as the dimension *L* is probably much greater than *H*, the force set up in the first case is also greater than in the second and third layout. A disadvantage of the last two designs is the larger variation in angular displacement of the worm shaft due to the rise and fall of the axle, with a correspondingly greater shock loading on the wheel teeth.

The loads on the worm shaft bearings are not affected by the torque arm design but the axle bearings are influenced to some extent, those in the scheme employing the first type being loaded slightly higher than in those of the second and third patterns, this again being due to the proportions of *H* and *L*, that of *H* being assumed as having the smaller value.

A method of eliminating the torque arm altogether would be to provide a bracket at the top of the final drive gearbox fitted with rollers riding between vertical faces mounted on the bogie frame structure and thus affording free movement in the vertical direction while eliminating it entirely in a rotary sense. Such a design would not remove the shock transmission to the vehicle structure and might involve a certain amount of difficulty in relation to other adjacent parts, *e.g.*, brake rods and levers. But it has certain commendable features that suggest the possibility of material advantages if properly tried out.

Notes and News

Dr. Büchi.—The Melville medal for 1937 of the American Society of Mechanical Engineers has been awarded to Dr. Alfred J. Büchi, of Winterthur, for his paper: "The Supercharging of Internal-Combustion Engines with Blowers Driven by Exhaust-Gas Turbines." Dr. Büchi was presented with the medal in New York, in September.

Waggonfabrik Talbot.—This well-known Aachen firm, which has built very many mechanical portions for the diesel railcars of the German State Railway, and also that humorously-named railcar the *Flying Spreewalder* (see issue of this Supplement for July 12, 1935), completed its centenary in October.

5,000 r.p.m.—A two-stroke opposed-piston aviation-type oil engine is now being run experimentally at a speed of 5,000 r.p.m. in conjunction with a mean effective pressure of 57 lb. per sq. in. In another test engine, a four-stroke, a mean *indicated* pressure of 255 lb. per sq. in. has been attained at a speed of 2,500 r.p.m. when pressure-charged.

Indian Railcar Operation.—The Indian-built 55-b.h.p. diesel railcar which was described in the July 8 issue of this Supplement, has now covered nearly 20,000 miles; it has given every satisfaction and is regularly hauling two carriages with 40 passengers, representing a trailing load of eight tons. Acceleration is reported to be excellent, and the top speed of 30 m.p.h. can be reached quickly. The fuel consumption is averaging 19 m.p.g., and as a result of an inspection after about 15,000 miles, it is expected that a mileage of at least 80,000 miles will be possible before a major overhaul. The tendered price for this car, which is powered by a Perkins engine mounted on a Commer standard chassis, was Rs. 10,000.

U.S.A.-Canadian Shunting Locomotives.—The Grand Trunk Western Railroad, the subsidiary of the Canadian National Railways which is located entirely in the U.S.A., now has in service the two 89-ton 600-b.h.p. oil-electric shunting locomotives the order for which was recorded in our July issue. They were built by the Electro-Motive Corporation and are powered by the usual Winton two-stroke eight-cylinder 600-b.h.p. engine. The electrical equipment permits a starting tractive effort of 60,000 lb., equivalent to 30 per cent. adhesion. These two locomotives are being used in the passenger and freight terminals at Detroit, and are of particular advantage there by their ability to work into the buildings of the automobile manufacturers without idler cars, which had to be used with steam locomotives, and this has materially improved the speed and convenience of shunting operations.

LOCAL RAILCARS FOR PERU

Repeat orders for simple and successful design

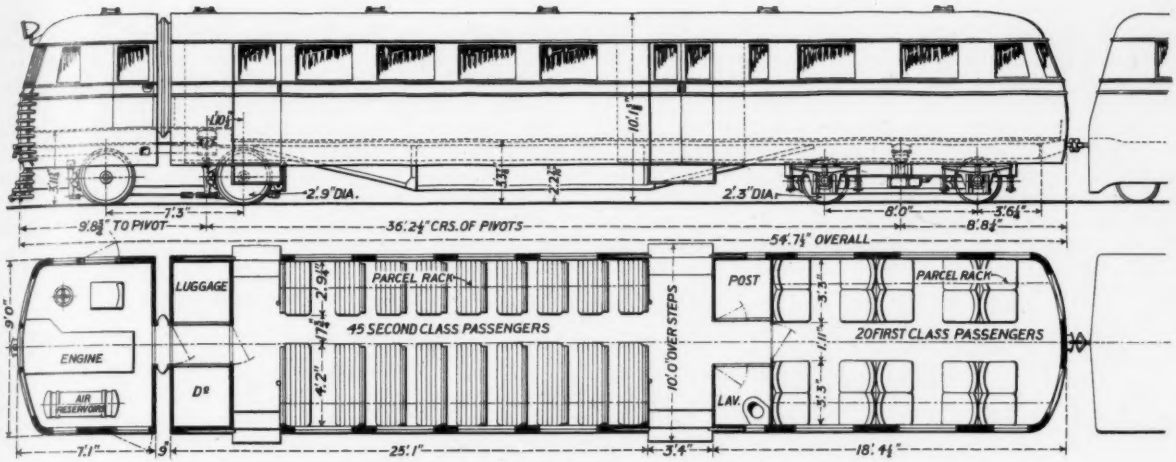


Diagram of single-end drive Walker railcar for the Peruvian Corporation

FOR operation on the standard-gauge local lines near the Pacific coast of Peru, Walker Bros. (Wigan) Limited has just delivered four of its standard 100-b.h.p. diesel-mechanical railcars to the order of the Peruvian Corporation. These cars are very similar in design to the vehicle supplied in 1936 to the Paita-Piura Railway of the Peruvian Corporation, which was illustrated and briefly described in the issue of this supplement for June 12, 1936, and like that vehicle were built to the inspection of Messrs. Livesey & Henderson, the consulting engineers to the owners. The design embodies the well-known Walker power bogie, the use of which enables all engine vibrations and smell to be kept away from the passenger saloon, and in addition is a very convenient method of removing the complete power plant from the car for maintenance or repairs. Where a number of cars are running from one depot the provision of a spare power bogie enables the maximum amount of work to be obtained from the cars, as a complete unit can be changed in about an hour.

Of the four railcars just shipped to South America, two have gone to the Paita-Piura Railway, and two to the Pacasmayo Railway. The first two have vacuum brakes and seat 20 first class and 46 second class passengers; the nominal track speeds provided by the four-speed gearbox are 11·2, 18·2, 30·5, and 49·5 m.p.h. The Pacasmayo railcars seat 20 first class and 45 second class passengers and have luggage and postal compartments. Westinghouse air brakes are incorporated, and the nominal track speeds are 9·1, 14·8, 24·8, and 40·3 m.p.h. In addition to these four cars, two others were shipped a short time ago to the Trujillo Railway, another Peruvian Corporation line. The gauge in this case is 3 ft., and the cars seat 22 first class and 56 second class passengers and are allowed a top speed of 50 m.p.h. on level track. The tare weight of the Pacasmayo railcars is 17·2 tons, and of the Paita-Piura vehicles 17·1 tons. Fully-laden, both types weigh about 21 tons, and the maximum axle load in the loaded condition is just over 6 tons.

The Pacasmayo railcars are designed for the haulage on certain occasions of a light four-wheeled trailer taring 7½ tons, and their power is sufficient to haul this trailer up a 1 in 40 grade at 15 m.p.h. Simple centre couplers are fitted at each end, along with brake and electrical connections. The maximum grade on the Pacasmayo Railway is 1 in 27, and curves of 375 ft. radius have to be negotiated on the line and 260 ft. in sidings. In normal operation the fuel consumption of the cars is about 14 m.p.g.

The Walker power bogie is built up on a framework of

General view of standard-gauge 100-b.h.p. diesel-mechanical railcar with two-class accommodation, Paita-Piura Railway

heavy steel plates and in its general construction is akin to the ordinary small locomotive frame. Upon it is mounted the driver's cab, with a bellows connection leading to the passenger saloon, and also all the power and auxiliary equipment, including the fuel tank which has a capacity of 27 gal. The cars are single-end drive, so that there is no need for any control apparatus or cables to be carried along the car length, and it is a feature of the design as a whole that everything is kept off the car underframe, which is quite free from the usual batteries, brake cylinders, reservoirs, and the like.

The driving controls consist of: (1) Throttle control lever incorporating dead-man feature, which stops the engine and applies the brake should the driver become incapacitated; (2) clutch pedal; (3) change-speed lever; (4) screw down hand brake, and (5) power brake. The instrument panel is fitted with speedometer reading in km.p.h., engine revolution counter, ammeter, engine oil pressure gauge, and radiator temperature gauge.

Solid disc wheels of 2 ft. 9 in. diameter, spread over a base of 7 ft. 3 in. are used in the power bogie. Only the inner axle is driven, through a worm reduction gear with a ratio of 4·1 to 1. The engine is of the Gardner 6LW type, set to give a maximum output of 102 b.h.p. at 1,700 r.p.m. developed in six 4½-in. by 6-in. cylinders. The engine is equipped with a C.A.V.-Bosch starting motor and dynamo, and the air filters are of the A.C. triplex oil-bath type. On the front of the power bogie is carried a gilled-tube cooling water radiator made by the Spiral Tube & Components Co. Ltd., and below this are some separate gilled-tube oil cooling elements. The auxiliaries are driven from the main engine by means of Tex-ropes. From the engine the torque is taken through the main clutch to a Meadows type 10 four-speed gearbox, and thence through a Layrub propellor shaft and flexible couplings to the final worm drive on the axle. The main clutch discs have friction linings of Don-flex, which has proved very satisfactory in eliminating jerky operation and giving a smooth take-up.

Timken roller bearings are used for all the axles, but the boxes themselves were made at the works of Walker Bros.; on the driving bogie the boxes are inside the wheels and on the trailing bogie they are outside. Lubrication of the driving bogie boxes is effected automatically by a feed from the casing of the final drive worm gear. Independent laminated springs with helical steel auxiliaries are fitted above the boxes of the trailing bogie, which is of a simple riveted steel type having main frames of channel section suitably braced with angles and plates. Solid disc wheels are used here also; they have a diameter of 2 ft. 3 in. and are spread over a base of 8 ft. On both trailing and driving bogies the Westinghouse compressed air brakes apply one block per wheel, and the blocks themselves have renewable cast-iron wearing pieces. The handbrake operates on the wheels of the driving bogie only. Westinghouse air sanding is applied to the forward side of the driving wheels.

The underframe of the car is built up by riveting. There are two main outer solebars of channel section, and a simple truss frame of angles is used to strengthen the structure. At the front and rear the underframe carries a cast steel pivot which fits into pivot cups on the driving bogie and trailing bogie, and side pads bear upon others mounted directly on the frame plates of the power bogie and trailing bogie. The complete body of the car was built by the Northern Counties Engineering Co. Ltd., of Wigan. It has an all-steel frame with steel panel and roof plates, and the interior lining is of plywood with a Rexine finish; the roof has an interior lining of Sundeala. In the second class compartment the seats are of wood, but those in the first class saloon are covered in Rexine and are mounted on light metal frames.

Second class saloon of one of the Walker railcars for Peru

The doors, parcel racks, and sundry other fittings are of Alpax, and the grab handles and exterior fittings are of chromium-plated steel. On the Pacasmayo railcars the windows are of the half-drop type, made by Hallam, Sleigh & Cheston, but in the two Paita-Piura railcars the windows are of Rawlings manufacture and those in the Trujillo cars are of the Beclawat Typhoon Major half-drop pattern. In view of the climate, no car-heating system is installed. The battery, which supplies both the car lighting and engine starting current, is of the Nife nickel-cadmium type with a capacity of 205 amp.hr. and 12 volts. An electric headlight is fitted above the driving windows and is fitted with a swivelling mechanism actuated by foot control. Warning indications are given by a double-tone Desilux horn of the type which is used so extensively on railcars.

A NEW RAILCAR DEPOT IN GERMANY

Running sheds and repair depot erected in the Ruhr at a cost of RM. 3,000,000

SINCE 1935 an increasing number of railcars has been allocated to the Dortmund depôt of the German State Railway, to cope with fast, short-distance transport in the Ruhr district. To house this stock it was decided to construct a repair and maintenance depôt at Dortmund, where, incidentally, the passenger station was in need of enlargement, as the daily passenger train average had risen from 211 in 1921 to 754 in 1937. The scheme for the railcar depôt comprised 12 tracks, housed in a 2½-acre shed. This shed is flanked on the east by a repair shop containing three tracks. Alongside these buildings are the stores, boiler rooms, and staff accommodation, and close to the point where the tracks converge are the oil and general stores.

In view of the different traffic demands, it was difficult to decide on a layout which would suit the present railcar-train formations as well as any future make-ups which might be allocated to the Ruhr. The three present combinations are:—

Railcar-driving trailer.
Railcar-driving trailer-railcar.
Railcar-driving trailer-railcar-driving trailer.

A large shed 150 m. (492 ft.) long has been built, and it can shelter two rakes consisting of three units, or three rakes comprising twin-units, one behind the other, on each track. To the north is situated the boiler room; this has two boilers, each with 125 sq. m. (1,337 sq. ft.) of heating surface, and a supplementary boiler with 15 sq. m. (160 sq. ft.) of heating surface, which is used only in the summer, and then simply to heat the circulating water in the railcars and to provide the general hot-water supply of the depôt.

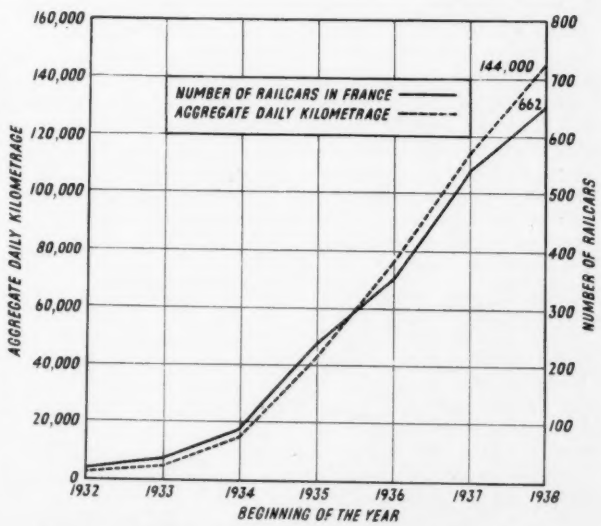
Next comes the workshop proper, including a rectifier plant for battery charging, a compressed air reservoir section, and a forge, where welding is also carried out. This workshop has three tracks, one of which has a longitudinal platform for the dismounting of bogies; the other two tracks are equipped with lateral and central pits. An electric travelling crane of 17·5 *tonnes* capacity serves three tracks, and lifts and lowers the power-transmission sets and also complete driving bogies. The first line is also equipped with central and lateral inspection pits, which facilitate the inspection and upkeep of parts situated beneath the floor of the railcar, such as batteries, braking apparatus, reservoirs, tanks, and miscellaneous equipment.

The twelfth track in the running shed is used, during slack periods of the day, for cars needing quick repairs, and this arrangement avoids disturbing repair shop routine. The German State Railway's experience has been that it is of vital importance to be able to carry out quick inspections in the pit before each railcar departs. All the running shed tracks have therefore been fitted with pits, but, with a view to economy, for the present certain tracks have only one pit, approximately 40 m. (131 ft.) long, at each end of the track. For the same reason, lateral pits have not been provided in the shed except on two intermediate lines and then only at certain points. The shed and repair shop are heated by air reheaters which, in summer, provide cool air. The pits are warmed by steam, through gilled pipes. The adjoining buildings have hot-water heating. Transport between the sheds, repair shop, and other buildings is by means of electric trolleys, with or without trailers, as necessary.

The three gravity fuel feeds are placed in front of the shed, on the west side. Each post serves two lines, and is fitted with a volumetric meter. The tank at each post contains 5 cu. metres (176 cu. ft.) of fuel, and is fed from an underground reservoir of 40 cu. metres (1,412 cu. ft.) capacity. This main tank is filled from ground level, and the in-going fuel passes first through filters. The total capacity of the reservoirs equals the average monthly consumption; thus the tanks may be completely emptied, this being considered an essential feature, for waste products, such as mud and water, collect in a sump low down in the reservoirs, and can be periodically removed.

French Railcar Statistics

AT the beginning of this year the French National Railways had a total of 662 railcars in service and 140 on order. In addition, there were 260 railcars on private and departmental railways, so that almost 1,100 railcars were then in service or on order in France as a whole. Of the National Railways' stud, almost 500 of the 662 cars in traffic were of the diesel type, and on the smaller systems 185 out of 260 railcars had oil engines. Monsieur Victor Nicolet, an Ingenieur-en-chef of the French National Railways, believes that system may ultimately have 1,500 railcars covering over 185,000 miles a day. At the beginning of this year railcar mileage on the National Railways represented 23½ per cent. of the passenger train mileage and 12¼ per cent. of the total train mileage, and was undertaken by 1,446 railcar drivers, compared with 30,937 drivers and firemen of steam trains. The proportion of the total mileage covered by railcars has increased during the past ten months. There is a tendency to increase the power per railcar, and many of the newest cars are of 500 and 600 b.h.p. with one or two engines. Although some of the important railcar services have just been withdrawn, cross-country runs are increasing.



Graph of the yearly railcar position on the five big French railways (now the National system)

DISCUSSION ON RAILCAR TRANSMISSION CONTROL

THE discussion on Major Wilson's paper read before the Institution of Mechanical Engineers (which paper is abstracted elsewhere in this issue), was confined largely not to the control of the various transmissions, but to the transmissions themselves and to their operating and economic characteristics.

Mr. Julian Tritton (Messrs. Rendel, Palmer & Tritton) opened the discussion by asking for some idea of the frequency with which the various operations had to be carried out with the different transmission systems, and also what were the relative weights per unit of torque for the makes described in the paper. Mr. Tritton was enamoured of the future of automatic mechanical transmissions, and he described with the aid of slides the Freeborn mechanical system, which was described in the issue of this Supplement for April 17, 1936. He wanted, too, a power unit which could be run out of the railcar in three minutes, and he believed that if this was achieved it would greatly encourage the proper performance of periodic maintenance.

Mr. T. Hornbuckle (L.M.S.R.) emphasised that the real problem with mechanical transmissions was not the transmission itself but the control, but the application of mechanical systems had been assisted by partial-hydraulic types, *e.g.*, fluid converters and fluid couplings. His experience with freewheels had been satisfactory, and such equipment appeared to have great advantages in allowing the engine to work under the best conditions, particularly in such cases as one he had in mind where observations had shown that on a given run the engines were working only one-quarter to one-third of the time. Mr. Hornbuckle was inclined to think that it was better to have a fairly simple equipment which needed a certain amount of skill in driving rather than a more complicated mechanism which was believed to be foolproof. An average driver was no fool, and it often paid to let him exercise his skill instead of making him into a robot.

Mr. Harold Sinclair (Hydraulic Coupling & Engineering Co. Ltd) described with the aid of slides the Legge synchro-mesh coupling, which could function as a freewheel and was useful to prevent over-speeding and to allow one engine in a multi-engined train to be shut down instead of being driven round with its fellows. Mr. Sinclair referred to the progress which has been made with scoop-controlled and other forms of fluid couplings, and showed an interesting torsiograph indicating how engine torsional vibrations were absorbed by the fluid coupling and not passed on to the driven shaft. The fluid coupling also acted in the reverse direction and prevented shocks and vibrations arising from the track and running gear being transmitted to the engine. The momentary collapse of the vortex in the fluid of the hydraulic coupling during reversal of direction could be used in certain instances to provide a soft gear-change, and the Cotal electro-magnetic gearbox was instanced.

Mr. E. R. Chadburn (Cotal Transmissions (Great Britain) Ltd.) recalled Mr. Tritton's plea for a motive power unit which could be run out from the railcar in three minutes, and said that he believed that on the latest Michelin cars in France, which, incidentally, are fitted with Cotal gearboxes, the power unit could be replaced in a very short time, if not quite down to Mr. Tritton's 180-second limit. The Cotal gearbox could be arranged to function as a freewheel, and this had been done in certain aviation applications.

Mr. E. W. Marten (Sulzer Bros. (London), Ltd.) referred to the undoubted advantages of electric transmission in enabling the engine to run continuously at speeds well away from the criticals and in preventing sudden shocks and variations in loading being thrown upon the engine. He mentioned that in certain cases it appeared to be the practice to derate engines when they were to be used in conjunction with mechanical transmission. It was possible that the increase in pressure-charged engines might, owing to the increase in power, show the characteristics of mechanical transmission to be unfavourable. With pressure-charged engines a slight modification had been made to the Sulzer-Brown Boveri form of servo field regulator control in order to ensure that if for any reason the supercharging pressure should fall the amount of fuel injected into the cylinders should be reduced to correspond with the actual pressure.

Dr. F. T. Barwell described a number of other mechanical and electrical transmissions which he thought should have been included in the paper, among them Renault, Gebus, and Asea systems, and the Sousedik electro-mechanical type.

Professor G. V. Lomonossoff thought that in no other language was there a paper which covered just the ground which Major Wilson had put before the meeting, but he regretted that the author had not included some of the American electric control systems, and had not mentioned at greater length some of the German hydro-kinetic systems. The principal advantages of electric transmissions had always been multiple-unit control and reliability over the whole power range, but mechanical transmissions could now be controlled in multiple-unit, and this was one of the greatest advances of that type of transmission during the last three or four years. The 1,200 b.h.p. Soviet diesel-mechanical locomotive which had been built under his supervision had covered well over a quarter of a million miles; the experiences had been most instructive, and it was planned to build a new high-power locomotive with an improved form of gear drive. The idea of a compound diesel engine was interesting; it had been proposed originally in pre-war years. As far as direct-drive diesel locomotives were concerned, only the recent Deutz locomotive (see issue of this Supplement for February 18, 1938) had met with any success. Professor Lomonossoff showed an indicator card taken from this locomotive at low speed and remarked how like it was unto a steam locomotive card.

N.Y.C. DIESEL LOCOMOTIVES.—The purchase of 29 diesel-electric switching locomotives for service in the Buffalo terminal district has been announced by the New York Central System. The purchase involves an expenditure of about $1,825,000, which will be made in instalments over a period of eight years. Twenty of these locomotives will be furnished by the Electro-Motive Corporation and the remaining nine by the American Locomotive Company. Each locomotive will be of 600-b.h.p. capacity and will weigh 99 tons.

NEW FRENCH RAILCAR TYPE.—The French National Railways are now busy testing the first of two Brissonneau et Lotz diesel-electric railcars of a new design. The cars are of the double-bogie type, powered by two S.G.C.M.-M.A.N. engines each developing 200 b.h.p. at 1,100 r.p.m. The two engines and their generators are mounted side by side in one engine room, and the bogie carrying the two traction motors is at the opposite end of the vehicle. The tare weight is 55 tons, the seating capacity 68, and the top speed is 68 m.p.h. Trailers are to be hauled. Heating of the car is by the engine exhaust gas, but an oil-burning boiler is fitted for trailer heating.